

A  
TREATISE  
ON  
OPHTHALMY;

'AND THOSE  
DISEASES WHICH ARE INDUCED BY INFLAMMATIONS  
OF THE EYES.

WITH  
NEW METHODS OF CURE.

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BY  
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SURGEON.

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PART THE FIRST.



Birmingham:  
PRINTED BY SWINNEY & HAWKINS;  
FOR  
G. G. & J. ROBINSON, PATERNOSTER-ROW, LONDON;  
CREECH, EDINBURGH; AND M'KENZIE, DUBLIN.

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1800.



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## PREFACE.

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TO practice any particular branch of the medical profession, with success, requires a general knowledge of the whole science; at the same time, it must be acknowledged, that if, from any peculiar coincidence of circumstances, a person's attention is more immediately directed to one class of diseases, he acquires a greater power of discrimination, and, from the mind dwelling much on one subject, he frequently obtains new ideas, and strikes out into a new and preferable mode of practice.

It is of little importance to my readers, to be told, how my attention came to be directed more particularly to the treatment of diseases of the eyes; it is sufficient to inform them, that for some years, I have had a considerable practice in that department of my profession, and that the hopes of being able to improve that particular branch, has principally induced me to publish this Treatise.

It is not however on that account solely, that I have ventured to appear before the public. The art of curing diseases has, of late years, made rapid strides towards arriving at that *acmé* of perfection, beyond which it is not in the power of man to advance it. The light which has been let in upon us, by the doctrines of that great

genius, Dr. John Brown, and so ably seconded by a Darwin, and a Beddoes, has laid the foundation of a new era in the annals of Medicine, and has opened new views to the practitioner, in the theory and treatment of diseases.

Since that epoch no regular treatise, on the inflammation of the eye, has appeared, in which the mode of treatment has been founded on systematic principles; and when we consider the importance and delicacy of that organ, we shall be surprised to find, how little has been done, towards arriving at a rational plan of cure.

The regular routine of bleeding, blisters and cathartics, with a variety of external applications, are generally indiscrimin-

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ately applied, with little attention to the nature, or the period of the disease; and there are some practitioners who act with still greater inconsistency, and maintain, that it is useless to inspect the eye; that it causes an unnecessary degree of irritation; and that we ought to trust entirely to internal medicines.

It is my intention to endeavour to point out the propriety of a certain mode of treatment, and to discriminate the proper time for the use of different applications.

On the first attack of an Opthalmy, the general circulation of the mass of fluids is not evidently increased, though it may be so in a short time, from the pain and irritation of the eye; I therefore consider

the disease as a topical affection, and that we ought chiefly to rely on local applications for a cure.

In speaking of the causes of Opthalmy, I have divided them into an increase of stimulus, or an increase of that something to which I have given the name of the irritable principle, but whether it ought to be considered as a quality of vitality, or as supplied by the brain, or from the atmosphere, I have not ventured to risk an opinion.

It probably may be thought, for a Treatise on the Opthalmy, I have entered into too long a digression upon the effects of *stimuli* applied to the body, and have been too prolix upon the laws relative to the accu-



mulation or exhaustion of this irritable principle. Much more might undoubtedly have been said, which would have better elucidated the doctrine, but I wished not to take up too much of my reader's time upon the discussion, and I knew not how, in saying less, to properly explain my ideas on those subjects.

It may, perhaps, not be improper in this place, to take a general view of what is intended to be given in the Second Part, which will conclude this Treatise.

In the first place I shall enter upon the cure of the inflammation of the eye.

In the laws of the animal economy, there is scarce any fact more clear than that a



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*stimulus* stronger than usual being applied to the moving fibre, makes it less easily excited into action, and that on the sudden subtraction of this increased *stimulus*, the motions of the part will be diminished.

Upon this law will depend my method of cure of the Opthalmy. The treatment of the disease admits of a variety of modifications ; but my principal object will be the application of a *stimulus*, in a peculiar manner, as great as the eye can bear, without being thrown into convulsive motions, and when this *stimulus* loses its effect of causing pain, to suddenly remove it, and diminish all *stimuli*, or irritating causes, as much as possible.

By these means a diminished action of the vessels will be induced, the pain will be moderated, and an alleviation of the symptoms will take place.

By convulsive motions are meant, those motions which take place from the injudicious application of too powerful stimulants ; as the tincture of opium, which has been so much extolled, under the name of the *Tinctura Thebaica*, by Mr. Ware, from an old *formula* of the College of Physicians. The tincture of opium is the most efficacious application that has ever been recommended to the public for inflammations of the eye ; but, like all other powerful medicines, whose *modus operandi* we are not well acquainted with, it is daily employed improperly, to the great pain and distress

of the patient. It will be my endeavour, in the succeeding part, to lay down rules for its application, and to explain on what its salutary effect depends.

The better to explain my mode of treatment and its effect, I shall insert a few cases, by which I hope the rational practitioner, in prescribing for inflammations of the eyes, will be enabled to appropriate the applications to each individual subject, and may act with a rational probability of success.

I shall then proceed to the cure of the Ophthalmy which has been of long continuance, and has put on an atonic form. This will be followed by the cure of different diseased actions of the vessels of the

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*cornea* and *conjunctiva*. To the whole will be subjoined, a concise inquiry into the powers and efficacy of those applications, which are generally made use of in inflammations of the eyes.

I hope to be able to send the Second Part, which will conclude this Treatise, to the press the beginning of next year.

*Birmingham, September 1,*  
1800.

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ERRATA—Page 128, line 21, for averted, read everted.  
—— 144, —— 14, for infection, read affection.





# T R E A T I S E

*ON THE*

## O P T H A L M Y, &c.



### INTRODUCTION.

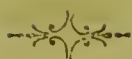
**T**HE Eye, from its peculiar organization and the delicacy of its structure, with the quickness and variety of its motions, besides being exposed to all those things which excite inflammation in general, is affected by a variety of noxious powers, which applied to another part would prove perfectly harmless: on these accounts, inflammations of the eyes are perhaps more frequent than of any other part, and, though not often dangerous

to life, are always troublesome, and, from the importance of the organ concerned, render a speedy removal of it extremely desirable.

Although total blindness from an Ophthalmy is not very frequent, yet a partial defect in the sight is not uncommon, and cases unfortunately sometimes occur in which the total loss of that important sense, with considerable pain and deformity, is the termination of the disease.

The hopes of being able to lay down a more rational plan of cure, and to point out the impropriety and danger of that indiscriminate manner followed in the treatment of Ophthalmy, which is too generally adopted, induced the Author to send into the world the following pages. After treating on the history, the causes, and cure of the disease, he will concisely inquire into the efficacy of a great number of applications to the eye, which are in general and esteemed use.





## THE DEFINITION AND HISTORY OF OPHTHALMY.

WHAT is usually meant by the term Opthalmy, is a redness and inflammation, with pain, of the *tunica conjunctiva*, or that membrane which covers the anterior part of the eye, where it ceases to be transparent, and lines the inside of the lids ; with pain of the eye, on exposure to light ; for though an inflammation will sometimes arise in the coats and globe of the eye itself, as a primary disease, yet that is so very seldom the case, comparatively with the frequency of the inflammation of the *tunica conjunctiva*, as not, commonly, to be separately considered.

On the first attack of an Opthalmy, the *tunica conjunctiva* becomes flightly red, with an increase of heat of the part ; the eye feels dry, and, at times, as if there were small particles of dust in it ; the lids do not move with their accustomed ease, and



the light causes some uneasiness. As the inflammation increases, the whole of the *adnata* becomes more red, and, to that degree, that, in a violent attack, there is not the least appearance of whiteness, neither can any vessel be distinctly seen, but an uniform fiery redness extending over the whole surface; the thickness of it is generally a little increased, and at times it is so much enlarged, as to make the *cornea* look as if it was depressed or sunk in the globe, which indicates a very violent disease, and has been called *chemosis* by authors: the sensation of heat becomes greater, and the patient feels as if pins or needles were piercing the eye, with a discharge of tears: the light becomes intolerable, even a small quantity produces great pain, with a copious flow of tears, and the lids are red and swelled. The pain is now not confined to the eye and lids only, but extends to the temple and forehead, and is sometimes diffused over the whole head. The irritation and pain produced are occasionally so

great, as to excite a considerable degree of fever, which, at times, though very seldom, is so great as to induce delirium.

Though the whole of the *conjunctiva* is generally inflamed, in nearly an equal degree, yet at times the redness is confined only to a small part, the other portion preserving its natural colour and appearance. When this happens, it will usually be found, that either some small extraneous body is adhering to the eye, or that there is a small pustule or ulcer on the *adnata*.

The light also, which, even in slight ophthalmies, commonly gives pain, sometimes causes very little irritation, though the appearance of the eye would strongly indicate the contrary; which must arise from the inflammation being confined to the external parts of the eye. On the other hand, in some cases, in which we suppose the *tunica choroides* and the internal parts mostly to be affected, though the appearance of the con-

*junctiva* shall be little changed, the smallest quantity of light causes great pain.

The redness or turgescence of the vessels, on the first appearance of the optholmy, never extends to the *cornea*, but is produced by the increased and diseased action, by which new vessels are formed, or the old ones elongated. It does not appear probable, that the vessels, which are seen on the *cornea transparens* are caused by the diameters of the old ones being enlarged, and allowing admision to the red particles of the blood, as they are never visible till the inflammation has continued some time, though it should be very violent and the action of the part great ; besides, were the vessels to be merely enlarged, the whole substance of the *cornea* would be red, whereas, unless in very severe and obstinate cases, it is always confined to the external surface, and frequently the vessels are very few in number, with generally either a thickening and opacity of the *cornea*, or an ulcer in the same part.

The discharge of tears is usually rather copious and the eye always moist; but cases are sometimes met with, in which the eye has been dry from the beginning, and continues so during the whole of the complaint: this arises from the irritation not being so great as to produce the sensation of pain, and on that account, the action of the lachrymal gland is not called into undue exertion.

It often happens, that either the discharge from the lachrymal gland, or from the small exhalent arteries of the *conjunctiva*, is so thickened as to form an adhesive matter, which firmly glews the lids together, more especially in a morning, after sleep. This, as it adds much to the irritation and pain in the part, should be prevented by the application of some bland soft ointment, to the edges of the lids, at bed time.

If the inflammation, from the beginning, has not been violent, or attended with much pain, and does not soon subside, from some

peculiar want of action in the part, or from the inflammation being occasionally increased, by want of attention to remove any exciting causes, or the use of improper applications, the eye will become so accustomed to its new motions, that the inflammation may be continued for a great length of time, without occasioning any opacity of the *cornea*, or being productive of much pain, and has generally been called the *atonic* or passive inflammation.

But when the inflammation has continued with violence for some time, the vessels assume various kinds of diseased actions, producing different effects on the eye. Hence when the irritation and pain have been great, the arteries are thrown into that kind of action, by which they secrete pus, which is deposited in different parts of the eye. As it is only the minute extremities of the vessels, that have this secreting power, and those on the *conjunctiva*, from the looseness of the cellular membrane



that surrounds them, are easily expanded, any formation of matter is seldom found there. The matter is at times discharged into the anterior chamber of the aqueous humour, where, descending to the bottom, by its own weight, it has an appearance similar to the white speck at the root of the nails, and has been called *onyx*. When the opthalmia is more violent, it not unfrequently happens, that the quantity of matter deposited in the anterior chamber, is so much more considerable, as almost to fill it, and then it takes the name of *hypopion*. Indeed sometimes, the anterior chamber is filled with pus, which, going through the pupil, occupies also the posterior chamber, when, if not speedily absorbed, it becomes inspissated, and remains fixed, forming adhesions to the capsule of the chrySTALLINE lens, or the *iris*, which prevents vision: or else, suppuration having previously commenced in the *cornea*, it gives way, and the matter is discharged through its aperture, which is afterwards succeeded by the

loss of the chrySTALLINE and vitreous humours, causing the coats of the eye to collapse. But matter is more frequently deposited in the substance of the *cornea* itself, than in any other part of the eye. If the increased action and sensation are not very violent, the vessels in many parts of the *cornea*, secrete a small quantity of *pus*, which is deposited at their extremities, and is not sufficient to produce a speck, but gives the eye a dull whitish muddy appearance, which has been called *nebula*, or a cloud: the pupil is scarcely visible through it, and objects are not distinguished by the patient. The organization of the *cornea* is not much injured by it, as on the inflammation subsiding, the opacity is soon absorbed, and the sight returns. When this peculiar action of the vessels is confined to one part, and matter is formed between the *laminæ* of the *cornea*, in such a quantity as to separate them for any space, a speck or film is produced; the degree of the ill effects of which will depend on its size and whether it is



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situated near the external surface of the *cornea* or not. If the inflammation subsides before the matter discharges itself, it often is almost entirely absorbed, and, if on one side of the *cornea*, near the *sclerotica*, the sight is not in the least injured; but when it is on the centre, immediately before the pupil, as there is usually some slight opacity remaining, from its structure being injured, vision is not perfectly distinct. When the thickening of the *cornea* is towards the centre, and so great as to prevent the passage of the rays of light to the *retina*, the eye will frequently accommodate itself to its imperfections, by turning on one side, that the transparent part of the *cornea* may be opposed to the object, and more perfect vision be obtained. I once saw a person, that had had an inflammation, succeeded by specks in both eyes in succession, some time intervening between each attack, and who had obtained such complete voluntary power over the muscles of the eyes, that, the opacity being so situated as on directing

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the axis of both the eyes, to one object, sight was very imperfect, she could turn either or both the eyes to or from the object, or in contrary directions, as she pleased. When the collection of matter is superficial and breaks; the contents of the abscess are discharged and an ulcer is formed, which gives the appearance of a small hole or depression: if very small, it will sometimes fill up and disappear; but if more deep, it frequently leaves a flat opaque surface, which is a great impediment to the sight, causing objects to appear as if they were seen through glass, that had been made in waves and whose surface is uneven. If the abscess should be very large and deeply situated in the substance of the *cornea*, and bursts externally, such a considerable support is frequently taken away from that part of the *cornea*, that the remaining portion is no longer able to support the action of the muscles, but gives way, and as, when all the muscles act at the same time, they press the sides of the eye nearer together and

inwards, a part of the *iris* is protruded through the wound in the *cornea*, forming a small black spot, which has been compared to the head of a common fly, and is spoken of by authors under the name of *myocephalus*. If the protrusion is small, though the form of the pupil is changed to an oblong, yet still the *iris* retains its motion and the sight is little injured: but if large, it loses its power of contraction, and dilation, and in some cases the edges, from being inflamed and remaining some time in contact, adhere, and the pupil is obliterated.

If the increased action of the vessels is considerable, yet not so great as to produce pus, which, on account of the structure of the part, cannot easily be formed, they go into another kind of diseased secretion, and new vessels and parts are formed, or the old ones elongated. Hence, at times, we find an increase of cellular substance to the *conjunctiva*, with a congeries of new vessels,

which generally produce a prominent ridge, running from one of the angles towards the centre of the *cornea*. At other times, when the inflammation has been violent and of some continuance, small vessels are to be seen on the external surface of the *cornea*; in general there are not many, and their course is from the edge of the *cornea* towards its centre, in right lines. Though commonly there are not more than from six to eight or ten of these vessels, in some the whole *cornea* is surrounded with them, which have the appearance of *radii*, converging to a centre; and, in some few cases, when the inflammation has been rather severe, has several times a little subsided and has again returned in quick succession, this diseased action has gone so far as to permeate the whole body of the *cornea*, giving it the appearance of a highly vascular substance. To form these new vessels, it is requisite that the circulation be not too much hurried, otherwise, instead of an accretion of new parts, *pus* only is secreted. This



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peculiar action of the vessels is not confined to the external surface of the eye alone. At times it affects the *iris*, and small spots or filaments are projected from its circular edge, which have somewhat the appearance of the *iris* in a horse. If they continue to be secreted, they extend themselves either till they unite with the projecting membrane on the other side, and thus form an opaque substance, which occupies the circular aperture of the *iris*, and prevents vision; or else, they unite to the capsule of the chrystalline lens, by which the motion of the *iris* is impeded, and the sight rendered very imperfect. It must be observed, however, that in this latter case, the vessels of the capsule of the chrystalline humour are previously affected with this kind of diseased action, which generally begins towards the centre, and if after the projecting fibres from the *iris* have continued some time, the eye is carefully examined, it will generally be found, there is a small opaque spot on the centre of the capsule.

In a few weeks, and sometimes even in a few days, it will be seen, that, the *iris* has almost lost all motion, and that near its edge on the capsule, there is a small circular clear ring, through which, what little sight the patient has, must be obtained, as the middle is occupied by the white opaque spot.

It sometimes though more rarely happens, that the chrystalline lens becomes opaque after a long and violent inflammation, more especially if it has been the consequence of a blow on the eye; and occasionally the action of the vessels in the internal part of the eye is so far diseased, as to change the structure of the vitreous humour or to induce a paralysis of the *retina*.



*The* CAUSES of OPTHALMY.

The same general causes, that excite inflammation in other parts of the body, will produce an opthalmey; but, on account of the delicacy of the structure of the eye, and its exposed situation, it is liable to be affected by so many things which, applied to other parts, would be innoxious, that it is wonderful inflammations of the eyes are not more frequent than they are: add to which, as an organ of sense, it is stimulated in a manner peculiar to itself, by light and colours.

Every symptom and appearance of the disease, shew that the *impetus* of the blood in the vessels of the part is increased, and of course any thing that can bring on a stronger and more frequent contraction of the fibres, may produce inflammation. This may be done, either by the application of those substances which stimulate the part



above the usual degree, causing an over exertion of the fibres ; or by diminishing for a time the usual *stimuli*, by which the irritable principle in the part will be accumulated, and the facility with which the fibres are excited into action increased; so that great exertions will be produced by the ordinary *stimuli*, or by those a little stronger than usual.

It is not however to be supposed, that any particular quantity of increased or diminished *stimulus* will produce an inflammation of the eyes : that will depend on the general state of the body, and the facility with which its irritable principle is brought into undue action, with the habitudes the fibres may have acquired of running into diseased associated motions, from a previous inflammation; as those who are in a convalescent state, from an intermittent fever, will experience a relapse, from those causes, which applied before the attack of the fever, would have been harmless: so

those who have once been affected by *cynanche tonsillaris*, are very liable to a return of the same complaint.

But to know how, or in what manner inflammation is excited by the above means, it may perhaps be necessary to inquire into a few of the laws of life, which are connected with it.

All our motions, then, whether they are obedient to the will, or involuntary, together with the various orders of vessels, which perform the different functions of the animal body, as those of circulation, secretion, absorption, digestion, &c. whether irritative, or sensitive, perform their motions from *stimuli* of various kinds, applied to the different parts; but to produce this action or motion, it is requisite that there be, as well as the *stimulus*, a certain quantity of the irritable principle, or of that something which constitutes life, in opposition to inert matter, in each fibre.

This principle has been generally supposed to depend on a something supplied by the brain, though some modern philosophers have attributed it to *oxygen*, obtained by respiration, from the atmosphere; and others have thought it might be explained, on the supposition of the action of the electric fluid; but what or which ever it may be, is in this place immaterial, as I only wish to point out the effects of certain causes, indifferent circumstances, without venturing to inquire what these causes may be; and the facts being acknowledged, whether the cause is considered, as the effect of the irritable principle, which may go under the name of vitality; or of irritability and sensibility, as called by Haller; or of excitability, as called by Brown; or of the spirit of animation by Dr. Darwin; or of electricity by others, the facts, as abstracted from the cause, will be still the same.

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As the health, and the regular performance of the different functions of the body depend upon a certain equalization of the *stimuli* applied and the quantity of the irritable principle, with the degree of tone existing in the moving fibre, when either of these are in a greater proportion than usual, the motions will become irregular and inordinate, and disease be the consequence. Thus inflammation may be induced, when the usual *stimuli* are increased or a new one superadded, the irritable principle being in the natural quantity, with proper tone of the fibre, as happens by the application of stimulant substances; or inflammation may be produced, when the *stimulus* is not greater than ordinary, but the irritable principle increased or accumulated, as takes place in going from a very dark to a light place, or from eating the usual quantity of food, after long abstinence.

Though it has been just remarked, that health consists in the equalization of the

*stimulus* and the irritable principle; yet either or each of these may be increased or diminished in a certain proportion, without disease, commonly so called, being induced, but merely a tendency or predisposition to it, which is liable to show itself on a still farther increase of the *stimulus*, or of the irritable principle, which ever it happens to be.

This may constitute the differences of constitutions, or of what has been considered, as temperaments. Thus in those people whose supply of the irritable principle is rather greater, than what health would strictly require, great strength or tone of the fibre is produced; the different functions are performed with great activity; the skin is hot and moist; the voluntary motions are executed with great facility and strength, and their passions are strong; digestion is carried on with vigour, and the power of assimilation is great, and the alvine evacuations are not frequent or large in quantity.



This is the most desirable state of existence, as the pleasurable sensations are strong, and the painful ones less frequent, than in any other: disease, also, though when it does come on, is generally violent and dangerous: yet it is difficult to be induced, as the system has, to some extent, the faculty of rendering harmless, those things that would prove noxious, to many other persons.

If a *stimulus* greater than natural is applied, unless it is attended with much pain, the parts are called into greater action, and the irritable principle is soon so much reduced as to put a stop to the undue exertions: or, being exposed to a *stimulus* less than natural, as cold; the great supply of the irritable principle, enables the body to prevent the accession of that torpid state of the vessels, which those of a contrary constitution experience; one feels comfortable and pleasant, whilst the other is shuddering with cold. We might carry the comparison still farther, and shew, that the

degree of cold that would destroy life in one, would be endured by the other with impunity.

On the contrary, in those whose irritability is barely sufficient to carry on the different functions of the body, pleasantly and regularly, as in those of a cool dry skin; whose strength is exhausted by flight, or short exertion; of moderate passions, and, if the appetite is good, whose alvine evacuations are frequent, and the contrary state, or costiveness, prejudicial, causing headaches and various unpleasant sensations; the system can but little accommodate itself to trifling changes of the usual *stimuli*; for the fibre, being in a state of atony or weakness, and its mobility much increased, it is very susceptible of any change of the usual *stimuli*. If the body is exposed to a current of air, which substracts the heat quicker than common, or to an atmosphere cooler than usual, a torpor is immediately induced, and with it, an accumulation of the irritable



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principle succeeded by irregular and diseased action: this by repetition is more easily brought on, and if the deficiency of *stimulus* should be greater than ordinary, and the torpor longer continued, inflammation will follow. Thus in those, who, in common language, are called scorbutic, whose hands, which are most exposed to heat of different degrees, are dry and cold, and whose skins are subject to crack, occasioned by a want of action, and atony in the cutaneous capillaries, from deficiency of the irritable principle; if they regulate the external *stimulus* of heat, or so manage it, that the change shall not be very sudden, as, by wearing thick leather gloves, the skin of their hands will continue whole; but let them go from a warm room, into an air not so cold as to affect those of a contrary constitution, suppose at 45 or 50 degrees of Fahrenheit, the hands will become cold and pale, they will then look rough and dry, and will eventually crack. If one part of the hand is more liable to torpor than the rest, which

often happens, and the cuticle is divided; by putting a bit of oily adhesive plaister on it, which will confine the heat, and keep up the action of the vessels, by the next day the cracks will have disappeared, and the skin be even softer and clearer, than that of the neighbouring parts.

With respect to the effects of a greater or less quantity of stimulus on the living fibre, or the irritable principle, we cannot perhaps set the facts relating to it, in a clearer point of view, than by considering the action, at different degrees of strength, of a stimulus which is well known to every one, and without whose presence, in a certain proportion, life cannot exist;—need I say, that I mean the *stimulus* of caloric or heat.

When heat at a high temperature is applied to any part of the body, the *stimulus* is so very great, as to immediately extinguish the life of the part, after which the

organization is completely destroyed; for, as it generally happens in atmospheric air, a decomposition takes place, forming some elastic products, and a coaly or carbonaceous residuum. When the *stimulus* of heat has not been so great, or applied only for a short time, the life of the muscular extremities of the capillaries is destroyed, stronger and more frequent contractions of the next fibres in succession are produced, and these exciting pain, act as a new *stimulus*, which assists in increasing the action, and inflammation is the consequence.

If the quantity of heat is rather less, the organization of the capillaries is not destroyed, but the irritability is nearly exhausted, and the effects of the application of the caloric will depend on the method of treating the part. If nothing is done to prevent the ill consequence of the burn, the neighbouring fibres roused into exertion, not only by the stimulus of an extra quantity of heat, but also by the disagreeable

sensation arising from the injury done to the capillaries, will be impelled into more frequent contraction, which, producing pain; an increase of *stimulus*; and if not of the irritable principle, at least of the activity of it; and serum will be secreted, which will arise in the form of a blister. If, on the other hand, cold is applied, as by immersing the part in cold water, it will cause temporary ease, but the pain that follows the withdrawing of the part from the water will be more acute, for the coldness of the water prevents the fibres, already very much exhausted, from regaining their natural proportion of the irritable principle, whilst the neighbouring parts suffer an accumulation of it, and thus every symptom is aggravated. But, on the contrary, if immediately after a slight burn, warm alcohol, or spirit of turpentine, (See Kentish on Burns,) be applied to the part, the first set of vessels, having been previously acted upon, by a much stronger *stimulus*, will be little affected, but the next order of vessels



will be excited into action, and their irritable principle diminished, when the pain will subside, and in a few hours afterwards, from the natural quantity of irritability being again accumulated, the healthy action of the part returns. When the quantity of heat applied is still less, the contraction of the vessels is increased, and the part becomes slightly red; but as the pain is not so great as to cause much sensation, the pain soon subsides, and the healthy motions return.

Our next degree of heat is what we are always exposed to, from the caloric in the atmosphere, under which, when moderate, all the functions of the body are pleasantly and regularly performed; but as it is liable to librations, being often in England, at one time of the year, sixty degrees hotter or colder than at another, according to the continuance of the greater, or less degree of heat than usual, or the rapidity of its changes, the body is liable to be affected in



different ways, and by diseases under different forms. Diseases too are more frequent, when the daily vicissitudes of heat are considerable, as in hot days and cool evenings, or when the atmosphere is loaded with moisture, which, by causing the air to be a much better conductor of heat, substracts it from our bodies quicker than ordinary, as is clearly perceived in going from a well ventilated room, into which the sun has had free admision, or where there has lately been a fire, into one no colder, as indicated by the thermometer, but into which, fresh air, and the light have not been able to enter, and whose walls are damp, and its atmosphere of course, saturated with moisture.

Man is able to exist under very different degrees of heat; yet the parts of his body are so fashioned, as to render him unable to bear the fervid heat of the equatorial regions, with impunity: for heat, on the body being continually exposed to it, above

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a certain quantity, is inimical to the duration of life. It is difficult to judge what precise time, the omnipotent Director of the universe ordained, that man should remain on this little speck of the creation ; but certain it is, that life is protracted to the greatest length in the temperate zones.

It has already been said, that life consists in the application and presence of a certain quantity, of *stimulus* and of the irritable principle, and it may here be added, that death will follow, when either of them are deficient in a certain degree. It may therefore be easily inferred, that the more the *stimulus*, or the irritable principle has been increased from birth, to carry on the animal functions, the sooner vitality will be extinguished. Thus between the tropics, the *stimulus* of the solar heat is the greatest, and the motions of the body are performed with more strength and celerity, in the early years of life; by the warmth of the climate puberty sooner arrives, succeeded by a pre-

mature and early old age, and in forty or fifty years they die. In these, the fibres having been previously much exerted from the undue *stimulus*, more speedily lose the power of being acted on by it, and animation becomes extinct.

This premature death is not induced by caloric only, but by every other stimulus. The potation of much spirituous liquors, the swallowing of large quantities of opium, or great voluntary and continued exertions, will produce the same effect. Hence the life of dram-drinkers is shortened, of those of the Mahomedan faith, who, being prohibited wine, make free with opium, and of the hard working and laborious mechanic.

In this temperate climate, we all have experienced the debilitating effects of a hot summer's day. The circulation is increased by it, both in frequency and force; the skin is hot and bathed in sweat, by the great

action of the capillaries, and, by noon, the whole body becomes languid and feeble, from the rapid expenditure of the irritable principle. On the contrary, the tonic power of cold, has been much spoken of, and highly commended by Physicians, but being only a negative quality, it acts, only, by its not allowing the irritable principle to be so quickly expended, and the moving fibre weakened.

The effects of a certain degree of cold will be different, on different constitutions : one, from a temporary diminution of the activity of the circulation, will feel invigorated ; whilst another, from a torpor being induced, followed by an increase of the contraction of the fibres, stronger than their degree of vigour can endure, will be enfeebled and languid.

As we descend in the scale of heat and arrive at about the temperature at which water freezes, on the body being ex-

posed to its influence, a temporary quiescence of the capillaries of the skin is brought on, and the pulsation of the arteries becomes slower; but when the muscular fibres have acquired a certain increase of the irritable principle, the diminished *stimulus* is sufficient to excite them into action, and if the quiescence has been great or long continued, strong contractions take place, as in the burning sensations we feel on coming into the house after riding on horse back in frosty weather, or after handling snow, which causes what is called the hot-ache.

If on torpor being present, the usual quantity of *stimulus* or a greater one is applied, the exertions become so great, as to bring on inflammation, as in those whose fingers being benumbed with cold, put them suddenly near the fire to warm them, which produces a *paronychia*: or in those who are first bitten, and have heat too suddenly applied to their bodies. If the



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cold is still greater, such a degree of quiescence takes place, as to put a stop to all action, and a succeeding *stimulus* is applied in vain, and the death either of a part, or of the whole body follows.

We cannot carry our inquiries respecting the effects of a very great degree of cold, or rather of a very small quantity of heat, so far as we can, of caloric at a high temperature: but we are told, that on some of the French Philosophers making experiments with ice and different mixtures to freeze Mercury, that, on one of them putting his finger for a few seconds, into the compound, which was some degrees below 0, it gave him an acute pain, as if pins, or sharp bodies were piercing his flesh.

I have been rather more prolix, in laying down the doctrine of the effect of the increase of *stimuli*, or of the irritable principle, than might perhaps, at the first view, appear necessary in a treatise on optholmy;

but as my plan of cure will a good deal depend on what has been just said, I could not with propriety say less, to make my ideas on the subject sufficiently clear, and indeed, as we proceed, I shall have occasion to touch on it again.

Inflammations of the eyes then may be caused, either by an increase of the usual *stimuli*, or of a new one superadded;

Or, by an increase or accumulation of the irritable principle. But to be more particular :

*First*, Inflammation may be excited, by any thing which can stimulate the vessels of the eye into actions greater than natural ; as,

A. By violence done to the eye by mechanical means, which seem to produce their effect, from the form and solidity of the particles, destroying the continuity of

the part, or from its motion being impeded, as, blows or wounds in the eye ; warts, or encysted tumors, on the lids ; an inversion of the ciliary edge of the eye lids ; or by foreign bodies inserted between the lids and the globe.

B. By stimulant and acrid substances.

C. By those things which affect the eye, as an organ of sense.

D. By any thing that will increase the action of the lachrymal gland, which by causing a more copious secretion of tears, will add to the irritation, and particularly if they are confined, as in the measles, small pox, &c.

E. By the action of the vessels in the vicinity being increased, as by erysipelatous, and various inflammatory affections of the face ; and wounds, or burns, of the same part.

2. By a *stimulus* less than natural, as by cold, ‡ as by going from a warm room into cold air.

Having mentioned, in general terms, those things that will produce inflammation of the eyes, we shall proceed to speak of each in detail, and first :

1. Blows on the eye, according to the force with which they are given, or the greater or less mobility of the system, or of the part, may bring on very different degrees of inflammation. If slight, the effects are most commonly of short duration, but if violent, a confusion of the coats and humours takes place, which produces an incurable blindness.

‡ Though cold is mentioned here, as well as in many other places, as a peculiar substance ; the reader will recollect that it is meant only to signify a smaller quantity of heat, than is comfortable to the feelings, or the sudden subtraction of a portion of heat, when it is applied in a greater degree.

After blows given by the hand closed, or any obtuse body, though little inflammation should follow, and only slight injury seem externally to be done to the eye, yet in a few hours, perfect blindness may come on; but in general, it is after several days have elapsed. On inspecting the eye, it will usually be found that the *iris* is motionless, and dilated rather more than the sound eye, and that the chrySTALLINE humour is slightly opaque; yet in so small a degree as to render it little more than visible, and often pushed a little on one side. The lens generally continues getting more opaque, till it puts on the usual appearance of the cataract, and after some months, the motion of the *iris*, with the sensibility of the *retina* often returns. In these cases, blindness is caused in the first instance, by the insensibility of the optic nerve, as the slight muddiness of the lens, cannot sufficiently account for the want of vision: and afterwards by the opacity of the lens; for the violence of the blow, producing some



change in the small transparent vessels of the lens, they still carry on their diseased action, whilst the sensibility of the retina slowly returns.

A sudden blow, being given to the eye, with a small blunt body, and probably in a peculiar direction, and with a certain force, will sometimes burst the capsule of the chrystalline lens, and force the body of the lens, through the *iris*, into the anterior chamber. About five years since, a man was brought to me, who was struck on the eye, with a piece of steel, that flew off the tool, he was hammering. On inspection, I found, on the outer side of the eye, about midway between the circumference of the *cornea* and the outer angle, a small extravasation of blood on the *tunica conjunctiva*, which in other respects appeared to be a good deal injured by the blow, and the chrystalline lens, was seen about half protruded through the aperture in the *iris*, into the anterior chamber, of the aqueous hu-

mour: the *iris* also in one part was slightly lacerated. On the next day, the whole of the lens was discovered to be in the anterior chamber, and which became opaque three days after the accident. He recovered from the subsequent inflammation, as soon as could be reasonably expected, and though it is five years since, the size of the lens is not apparently diminished, and in that time, he has only had one attack of inflammation, so violent as to prevent him from attending to his usual employ, though it is frequently slightly red and irritable.

A few weeks since, also, a man wished my advice, for an inflammation, attended with a good deal of pain, which he had in one eye. On examining the eye, I saw, to my surprise, that the chrystalline lens, which appeared of the natural size, occupied almost the whole of the anterior chamber, yet not so much so, but that the *iris* could be perceived to have preserved its proper figure, and looking at the eye in

one direction, I thought I could perceive an opacity of the capsule of the lens. On my inquiring into the history of his complaint, he told me, that more than *twenty two* years ago, as he was digging in a ditch, a twig struck him with considerable force, on the eye; that he could see a little after the accident, but that by the next day, the eye became very painful and swelled, and that on the inflammation subsiding, he found he had totally lost the sight of the eye. In a few weeks, the eye became free from pain, and from that time to this last attack, which he attributes to cold, and which is a period of 22 years, he says it has never prevented him from attending to business, though he recollected, on my questioning him, that two or three times, the eye had been slightly red and troublesome, for a few days.

We learn from these cases, that the chrystalline lens is not easily absorbed, when deprived of its capsule; and that it

may remain in the eye, and act as an extraneous substance for many years, without causing much irritation. Hence it is very probable, that in depressing the cataract, the lens is not absorbed, as is generally supposed, but lies buried in the vitreous humour, and as it does not produce much irritation, when situated in the anterior chamber of the aqueous humour, where it must, in some degree, press upon the irritable *iris*, it is not likely to do so, when concealed in the vitreous humour.

2. The danger attending wounds and punctures, is still more formidable. A sword or knife, dividing the coats of the eye, causes an evacuation of the humours, succeeded by total and irreparable blindness. If the instrument is pushed with much violence, it may pierce through the globe, fracture the thin bones at the bottom of the orbit, and penetrate the brain itself. Such wounds are frequently followed, by the most dreadful head-aches, large ab-

scesces following the inflammation, and if the brain is compressed, immediate death.

If the wound is inflicted by a needle or any small sharp instrument, the danger will depend on the depth and direction of the puncture. When the instrument has merely pierced the *cornea*, without either touching the *iris* or the chrystalline lens, the wound usually heals in a few days, with a moderate inflammation, leaving a small opacity, which when not towards the centre of the *cornea*, gives little inconvenience: but if, unfortunately, it penetrates, or even touches, the chrystalline lens, although at first, the sight should not be much impaired, it is greatly to be feared, that it will be affected in a week or two, and produce one species of cataract which will obstruct the rays of light in their passage to the retina, and prevent vision.

If, by the wound, the *iris* is divided or the *cornea* penetrated very near where it is



joined to the *tunica sclerotica*, part of the *iris* is frequently protruded through the aperture, and forms one species of the *staphiloma*. In that case, the figure of the pupil is changed, from a circular to an oval, or some other irregular form; but if the protrusion is small, the part of the *iris* which is not displaced preserves its power of contracting and dilating, and the sight, after the subsiding of the inflammation, is as perfect as before. If the protrusion has been greater, it forms a large irregular projecting substance, which, by rubbing against the lids, adds much to the irritation, and in consequence, the inflammation is much increased, which frequently produces adhesions of the *iris*, with loss of motion, a thickening of the *cornea* or of the chrystalline lens, that is succeeded by an incurable blindness.

Wounds made through the *tunica sclerotica* and *choroides* must either enter the chrystalline lens, causing an opacity of it,

or if it goes more inwards, will injure the *retina*, and produce a confirmed *gutta serena*, with immobility and a dilation of the *iris*. Wounds, therefore, that are made in the *sclerotica* are always hazardous, and the danger is increased, according to the magnitude of the solution of continuity, and its distance from the *cornea transparens*.

An extravasation of blood, under the *tunica conjunctiva*, is frequently produced by blows on the eye, as well as by punctures and small wounds, from some small artery or arteries being divided, which cannot pour out their contents externally. The quantity of blood thus extravasated, is sometimes so considerable as to elevate the whole *conjunctiva* above the *cornea*, in the same manner as in the *chemosis*; but in general the quantity is much smaller, only forming an irregular red spot or space round the mouth of the vessel, and unless the eye has been otherwise injured, though the red spot should be considerable, little

pain will be experienced, and the sight will not be at all affected. Absorption often goes on slowly, and the blood is several weeks in disappearing, to the great uneasiness of the patient; the *serum* is first absorbed, and the blood becomes darker coloured, and almost livid; it then gradually changes, and goes through all the intermediate shades of colour, from a very dark to a greenish yellow hue, and thence to its natural appearance.

3. Warts and encysted tumours of different kinds, situated on the lids, are frequently the cause of inflammation. Some people, but more especially children, have repeated crops of warts on the lids, that are commonly situated towards the edge of them; and which, by their irritation, induce inflammation. The tumours that are met with on the lids are various in their size, and in the appearance of their contents, and on that account have had different names given to them by authors. They are at times of a

considerable size; and when they happen to be on the upper lid, by the impediment that arises to its free motion, and the pressure which they make on the eye, they are often a great source of inconvenience. The tumours for the most part are moveable, and contain a matter of different degrees of consistence, from a glairy gelatinous like substance, somewhat similar to the white of an egg, to one as thick and as firm as suet or cheese.

Nearly allied to the encysted tumours above-mentioned are those small inflammatory tumours, which speedily terminate in suppuration: they are frequently formed towards the edge of the lids, and are commonly called Styes, Stians, or Pouks. These are often productive of a temporary inflammation; but as they usually suppurate in three or four days, it is seldom of any long continuance, unless the eye, from previous disease, is more inclined to run into diseased actions. When matter is fully formed in

them, they may be opened with the point of a lancet ; or if the tumour should be situated on the edge of the lid, it will often be sufficient to extract two or three of the eyelashes, whose roots penetrating its body, on being removed, will afford an opportunity for the evacuation of the matter.

4. An inversion of the edges of the eyelids, called by authors *Trichiasis*, is at times another cause of Ophthalmia. This, from the continual irritation produced by the rubbing of the hairs against the eye, causes an inflammation, which, if the inversion is not soon removed, will be productive of a good deal of mischief. The disorder generally comes on in a gradual manner, and unless, at its commencement, or joined with some other cause of inflammation, often gives no violent pain ; but an unceasing irritation, with a constant flow of tears, on the motion of the lids. Many of the vessels of the *conjunctiva* are enlarged, and there is either an accretion of new



vessels on the *cornea*, or a general opacity of it; and as both those diseased appearances are often absorbed, on the cause being removed, we sometimes see those that have been blind for months, on the inversion being cured, have in a short time recovered their sight.

A preternatural or a double row of hairs is sometimes formed, and again at other times, either the hairs are placed irregularly on the ciliary edge, or there are only a few supernumerary ones; these, by rubbing against the eye, cause inflammation in the same manner as the *trichiasis*.

5. Extraneous bodies inserted between the lids are not an unfrequent cause of optholmy. The irritation they excite in the part in which they are fixed, and their hard and uneven surfaces, rubbing against the opposite part, on the least motion of the eye, or the lids, produce great pain, with an inability to repeat the motion

of the lids, succeeded by a violent and dangerous inflammation, more especially if the extraneous bodies, besides the irritation from their bulk and hardness, possess any stimulant qualities, as lime.

6. There are a variety of substances, which stimulate the fibres into undue exertion exciting inflammation, whose effects cannot be accounted for, from the general laws of matter, as far as relate to their size, hardness or shape, but are owing to certain combinations, which produce such motions in the living system, that the knowledge of their component parts, would not lead us to suppose probable: these may be called chemical causes of inflammation, such are the application to the eye of essential oils, acids, or acid vapours, alkalies, and the different compounds, in which either an alkali or an acid is an ingredient, acrid juices, and that universal and diffused *stimulant*, caloric.

7. There are others which act on the eye as an organ of sense only, whose stimulant effects are peculiar to the *retina*; as much light, particularly after the sensibility of the optic nerve is increased, from confinement in a dark place; exposing the eye for some time to snow, whose exciting power is much increased by a clear sky or sun shine; the eye being long fixed on vivid and bright colours.

8. Inflammation in many instances is brought on by the increase of the action of the lachrymal gland, causing a greater flow of tears, whose saltness or acrimony, seems to depend on the stronger exertion of the secreting vessels, as is seen in much weeping from mental affections.

The probability of inflammation being induced, is increased if, with the greater flow of tears, the neighbouring parts are inflamed, as in the measles, when the nose, the eye-lids, and the parts adjoining, and

even the whole face are generally swelled and inflamed; and indeed inflammations of the eyes are very common, immediately previous to or during their eruption, which often continue for some time, causing small ulcers and opacities of the *cornea*. As the eruption of the measles disappear, the redness of the eyes generally subsides, though from the action of the vessels being increased, during some days, and the mobility of the system being greater than usual, the vessels are extremely liable to run again into diseased motions on the application of a greater or less degree of heat, than common, and often, for months, the most trivial variations of heat and cold, will excite a temporary inflammation, which at times is converted into a very obstinate and painful disorder,

The bad effects arising from an increased secretion of tears, will no doubt be much aggravated, if, with the inflammation of the lids, they should be so much swelled as to pre-



vent their being opened, which happens in the small pox. In that disease the eye-lids are frequently tumefied and firmly closed for several days, and from the confinement of the acrid tears, the most dreadful consequences follow. On the eye-lids being again separated, the *conjunctiva* is frequently found highly inflamed, and the *cornea transparens* ulcerated. If the *cornea* should be unaffected and the redness of the *conjunctiva* soon disappear, the eyes will for some time be liable to a recurrence of the inflammation, from trivial causes, the same as has been mentioned to happen, after the measles.

It is generally supposed that those opacities of the *cornea*, which sometimes attend the small pox, are the consequence of a pustule or pustules being formed there; and judging *à priori*, we might naturally conjecture, that when the face is entirely covered with the eruption, it would be probable the external surface of the eye would not escape.



It very seldom, however, happens, that any pustule is found on the *tunica conjunctiva*; and though I have attended particularly to that subject, I have never been able to detect what I could call a small pock pustule on the *cornea*. It is true, on the opening of the eye there is seen, occasionally, on the *cornea*, a vesicle, filled with an opaque matter, which has a good deal the appearance of a small pock pustule, but instead of going off like the other pustules, it continues, or is absorbed the same as a common collection of matter from an ordinary inflammation; besides, it is never seen with the commencement of the eruption of the face, but only after the lids have been closed for several days, which makes it probable that it is the consequence of the confinement of the acrid tears, with the consequent inflammation.

Whence is it that pustules are so seldom formed on the anterior surface of the eye? Do the vessels with difficulty run into

that kind of diseased action, from some peculiar structure of the part; or can the peculiar action of the vessels be prevented, from the eye being always kept moist, and a considerable cooling process almost constantly going on, by the continual evaporation. We cannot easily inform ourselves of the heat of the eye, in its natural state; but in those animals who have a moist surface, exposed to the air, as the noses of cats and dogs, on touching them, they generally give us the sensation of coldness. We know that the quantity of pustules produced depends in a great degree on the state of the body, with respect to heat; hence the eruption is thickest on those parts that are covered with plasters, and the good effects of moderating the heat of the body, is universally allowed.

Under the same head of an increased secretion of tears, or of their confinement to the eye as a cause of Opthralmy, may be included the *fistula lachrymalis*. This dis-

case, so named from a mistaken idea, that the ancient physicians had formed of its nature, cannot with propriety be called a *fistula lachrymalis*, unless in the very advanced stages of it. It is caused by an obstruction of the lachrymal canal, which conveys the tears from the eye to the nose, after having performed their office of moistening the eye, and by that means keeping the *cornea* transparent. On the passage of the tears into the nose being obstructed, the *saccus lachrymalis* becomes distended, and the tears, instead of being absorbed by the *puncta lachrymalia*, remain in the eye, confined by the lower lid, till they are collected in such a quantity, as to run over the ciliary edge, and down the cheek: these proving a source of irritation by their long continuance in the eye, as well as by their stimulating effect on the lachrymal gland, causing a greater secretion of tears, excite inflammation.

9. Inflammation of the eyes may also be brought on by any thing that causes much inflammation of the face, as various erysipelatous affections, particularly that species which is called St. Anthony's fire, or by burns or wounds, in the vicinity of the eye.

Having gone through the different causes which produce inflammation of the eyes, by directly stimulating the vessels into greater action, I shall proceed to the second division, in which, inflammation is induced by the subtraction of the usual *stimuli* for a time, and then from the sudden application of it again, in the natural quantity or perhaps rather greater than ordinary. This, by allowing an accumulation of the irritable principle, ultimately brings on inordinate and diseased action. The principle of irritability is generally diffused pretty equally through the fibres of our whole system, and, unless excited in some particular part, by great pleasure or pain, tends to an equilibrium; but in those



muscles whose motions are involuntary, the supply of the irritable principle having been constant and perpetual from birth, their action being necessary to existence, though the usual *stimulus*, and, of course, their exertion is diminished, still they have their accustomed supply of this principle, which becomes accumulated, either, till the natural quantity of *stimulus* is re-applied, or, until the accumulation is so great as to render the part susceptible to be acted on by the smaller *stimulus*. (See Darwin's *Zoonomia*).

The same laws with respect to the accumulation and exhaustion of the irritable principle, is observed in the inferior animals, and is extended also to the vegetable tribe. Spallanzani remarks, that in the autumn newts bury themselves and become torpid; when the thermometer is at 54, and that, during the winter, they regain their irritability and re-appear in the spring, when the thermometer, is considerably below 54:



and, he observed, that when in spring he exposed the vipers that were torpid to the heat of 67 degrees only they died, though, during summer, they bear a much greater degree of heat without the least injury. Vegetables sleep in winter, and are awakened by the vernal sun ; but die if a too powerful heat be suddenly applied, from their accumulation of irritability.

The voluntary muscles, or those of locomotion, have, from habit, acquired a great facility by voluntariness, either of directing the irritable principle to or exciting it in certain fibres, in preference to others. Nevertheless, it is not to be supposed that it is ever in a passive state in them, as asserted by some authors : though not supplied in that quantity as in the involuntary muscles, it is in constant action, as is seen in the tremor of old men in the palsy of the head ; and from the contraction of antagonist muscles, when those which counterpoise them are cut through, or lose their action, (called by Haller the

*vis insita*), from a paralytic affection. It is probable that this voluntariness is a good deal acquired by habit, from the extreme awkwardness of an infant learning to walk, and by muscles, from frequent use, acquiring strength, or more properly speaking, from their obtaining the power of directing or exciting a large quantity of the irritable principle in a given time to certain muscular fibres. It would appear, too, from the almost incessant motions of young animals as of children, who, unless asleep, are in almost constant action, or in the play of puppies and kittens, that in the earliest period of our existence it was more constantly and regularly diffused over the whole system.

Though an excess or defect of the accustomed *stimuli* produces a temporary quiescence of the part, yet as the causes are totally different, so are their effects. In the first case the torpor is induced by the *stimulus* exciting the muscular fibres into greater action than natural, which expends the

irritable principle faster than it can be generated, and by that means diminishes its power of being excited, and renders the part incapable of carrying on its usual motions, unless by the application of a stronger exciting cause. On the withdrawing of the stronger *stimulus*, the ordinary ones do not produce their accustomed effects till the irritable principle is again collected in its usual quantity; when the motions of the part proceed as before.

On the contrary, in the quiescence induced by the deficiency of *stimulus*, there is an accumulation of the irritable principle, which is called into exertion by a *stimulus* less than natural, which when once brought into action, the fibres are excited into such strong contractions as to cause pain, which acts as a powerful *stimulus*, and if violent, or long continued, exhausts the irritable fibre, and induces torpor: the irritable principle is then gradually collected, the parts are obedient

to their ordinary *stimuli*, and their motions are performed as usual and health returns.

This desirable termination however does not always happen, for on the sudden application of the natural *stimulus*, when the irritable principle is much accumulated; as in those who have been long without food, or who have been exposed to much cold, inflammation will succeed: this will arise the more easily, if, from previous disease, the fibres are easily excited into inordinate and irregular exertions from associated actions.

From what has been said, it may be inferred, that the irritable principle with respect to the moving fibre may be in three different states:

1<sup>st</sup>. When the expenditure by the action of *stimuli* is equal to its supply, it may then be said to be in a state of *Tone*.



2d. When the expenditure exceeds the supply of this principle to the fibre, it may be said to be in a state of *Exhaustion*.

3d. But if the supply of the irritable principle given to the moving fibre, exceeds the expenditure, it may then be said to be in a state of *Accumulation*.

A deficiency of *stimulus*, is by far the most common cause of opthalmia. On the application of any stimulant substance, the pain that it induces immediately warns us of the danger, and we hasten to remove it, which being done, the very cause that induced the increased action, and which would continue it, is taken away, and the contractions directly begin to diminish.

If the heat of the atmosphere is increased which is the *stimulus*, we are most exposed to, on its being again brought to its ordinary standard, no inflammation follows, but the force of the contractions gradually



cease and the healthy action returns. No additional thing can be applied to the eye, independent of its relative degree of heat and cold, but what will act as a *stimulus*, and on that account, in considering those causes that will diminish action, we must totally exclude all substances, to which the eyes are not usually exposed.

The eyes are exposed to the *stimulus* of the tears, of the blood, of the air, of light, and of heat. An alteration, in the usual secretion of the tears, may increase, but cannot diminish their stimulating effect; the blood, according to its quantity or quality, may have its exciting effects, either increased or diminished, but as that will act as a general cause on the system, it cannot properly be introduced here; the atmospheric air also, as it is supposed, from the experiments of Dr. Beddoes, to owe its stimulating power to the *oxygen*, that is one of its constituent parts, the proportion of which, is subject to very slight variations, cannot be thought

to differ much in its effects on the eye at different times, and the absence of light, during the healthy state of the eye, does not appear to diminish the action of the vessels, though in an inflamed or irritable state, it produces a considerable effect on them; there is only one cause then, to which we can attribute the diminution of the *stimulus*, and the decrease of action, which is caloric.

The quantity of heat to which we are exposed is varying every minute, and will often change in a few hours, more than thirty degrees; this changeableness is greater, from the inventions of civilized life, from hot rooms, and partial clothing: and the exposed and uncovered state of the eyes, whilst other parts of the body are defended by substances, which transmit heat slowly, make them more liable to be affected.

Whether heat is applied to the eye above or under the usual degree, previous to inflammation, a torpor will be induced which will be more likely to happen, when the change is sudden; as in going from a warm room into the night air, but as, at the time it seldom occasions any unpleasant symptom, it is disregarded till the subsequent reaction takes place.

But in most instances there is a predisposition to the disease, and though the torpor at first may be small, and the reaction also not great, yet it may be sufficient to produce another state of quiescence, rather more considerable than the first, which again produces an accumulation of the irritable principle, and the accumulation and exhaustion, continue alternately to come on, till a violent disease is formed.

In treating on the causes, which generally produce Ophthalmies, it may perhaps be thought necessary, that something should

be said respecting *scrophula*, and *syphilis*, as they are considered, by medical writers on the subject, as often the causes of inflammation of the eyes. It is very common to see those, who have evident marks of a scrophulous habit, affected with Ophtalmia; and when once it comes on, it is in general, not only a long time in subsiding, but very liable to return from trivial changes in the quantity of the ordinary *stimuli*, and particularly from variations of the atmosphere. I conceive that *scrophula* cannot be said with propriety to be the cause of Ophtalmia, but merely renders any part of the system more susceptible to the action of any exciting causes, to which it is exposed, from its inability of resisting noxious powers, and its not being able to accommodate itself to small changes.

The *scrophula*, according to Dr. Cullen, depends on a *peculiar* constitution of the lymphatic system; that, however, is advancing but little towards arriving at an



accurate idea of the disease. May we not conclude that this peculiar constitution is owing to a want of energy or activity in the whole system, but particularly of the absorbents? That it depends a good deal on the deficiency of vigour of the whole body, appears, from those causes that tend to produce it, having a debilitating effect; as living in low, moist, and confined situations, inflammatory diseases, small pox, poor diet, want of pure air and exercise; and that general weakness and want of energy are present, is probable from the cold extremities, the frequency in the winter of chilblains in the hands, and kided heels; from injuries threatening the body being feebly resisted, and from the slow recovery of the constitution from disease. That there is a deficiency of irritability, or want of energy in the absorbents, in those that are predisposed to *scrophula*, appears from the moist skin, from the difficulty with which ulcers heal, on account of the want of power of the lymphatics to absorb the fluid secreted



by the capillaries, causing the discharge of an acrimonious fluid.

Concluding, that in scrophulous habits there is a deficiency of activity in the system in general, and of the absorbents in particular, it will easily be understood, that if there should be an accumulation of the irritable principle, from defect of *stimulus*, as from cold; on the increase of exertion, succeeding to the torpor, the cutaneous absorbents may take up a greater quantity of fluid than usual, and this increased activity, not extending to the next order of absorbent vessels, beginning at the glands, they may be supplied with more than they can absorb, and an accumulation of lymph may be produced, causing an enlargement of the gland, and in the end, inflammation: from the want of energy, too, the system is rendered more susceptible of being affected by any irregularity in the usual *stimuli*; thus they are subject to *phthisis pulmonalis*, *cynanche tonsillaris*, catarrh, and ophthalmies,

and in those disorders it will be recollected, that the parts affected are not only easily excited into action, but are also particularly exposed to the sudden changes in the heat of the medium that surrounds us.

When the ordinary *stimuli*, as heat and cold, food, &c. are uniformly and regularly applied, the different functions of the body are performed properly; and the secretions and absorptions are equal; but as from the deficiency of strength of the muscular fibres, a torpor of the extreme vessels is easily induced, their actions must frequently be irregular, and this often recurring, it is not wonderful that so delicate a part as the eye, and which is so much exposed, should in our earlier years be affected with inflammation, which, when once brought on, is, from association, much more likely to return on the same irregular action again taking place. It will in general be found, that the more delicate and fair the skin is, the more susceptible they are of diseased motions.

On examining the inflamed eyes of those who have signs of *scrophula*, as fair skins, swelled over-lips, and some of the glands of the neck enlarged, there is seldom a general increase of action of the vessels of the *conjunctiva*: there are vessels to be seen larger than natural over the whole surface, but the white colour of the *tunica albuginea*, is visible between them, nearly of its usual appearance; much light gives pain, causing a plentiful effusion of tears, and when the disease has continued some time, the ciliary edges of the eye-lids are often affected; some of the hairs come off, and the small sebaceous glands, *glandulæ, Meibomii*, are inflamed, and at times ulcerated, causing the Psorophthlmy of Mr. Ware.

It has been supposed that these small glands are diseased on account of that tendency of enlargement, and inflammation of the glands in *scrophula*; but I think it may be better accounted for, from the great sen-



sibility of scrophulous habits, and the frequent and almost incessant discharge of hot acrid tears, over the edge of the eyelids, which are often so acrimonious as to excoriate the cheek. When these glands have once acquired this diseased action, it is more easily repeated, and eventually slight causes will bring it on, and they may be a good deal inflamed when little increased action is to be seen in the eye. It would be paying an ill compliment to a fine complexion, to say, that all those who have fair skins, have a tendency to *scrophula*; I may, however, venture to assert, that the more delicate the skin of my patient, the more tedious is the cure of the Opthalmy, and the more liable it is to return from slight causes.

This rule, I need not say, will not hold good inversely, for there is another disease that people with dark complexions are subject to, which will now be slightly touched on.



The disease alluded to, as far as I can recollect, has not been accurately defined by medical writers. In common and familiar language, it is called scorbutic, though it does not seem to have any connection with the *scorbutus* of nosologists. It appears to be a debility, and want of action in the cutaneous vessels, and is marked by a dry and harsh skin, little or no colour in the cheeks, the cuticle by places coming off in powder, or in scales; when the skin is abraded it is a long time in healing, eruptions in different parts of the body are common, especially in those that are most exposed, as the face and hands, sometimes in small red pimples which suppurate, at others, small vesications filled with a transparent fluid arise, attended with an itching and burning; these break, and are succeeded by others, and in this manner it will occasionally continue for months, causing much pain and uneasiness. People of this constitution slowly recover from inflammations of the eyes. It is seldom attended with much pain, unless



for a few days at the commencement of the disorder; and though the vessels of the *conjunctiva* shall be a good deal enlarged, the light causes little inconvenience. A discharge of adhesive matter from the lids also, is frequent, part of the eye lashes fall off, and the glands ulcerate; indeed sometimes, after the inflammation has repeatedly recurred; it is entirely confined to the lids.

From the cutaneous vessels having less energy of action than usual, some degree of torpor will take place from a *stimulus* very little under the ordinary standard; and it is not uncommon for the patient, though he cannot recollect being exposed to either an unpleasant quantity of heat, or cold, to go to bed with the eyes and eyelids apparently well, and to awake in the morning with the lids inflamed, and firmly closed with an adhesive matter. On carefully cleaning the lids with a little warm water, by evening the inflammation frequently subsides, and the part affected

nearly recovers its natural appearance. In those cases, it will generally be found, that the patient, just before going to bed, has been either in a hot room or near the fire, and has gone out of doors, and exposed himself to the cool night air, which has brought on torpor, and a succeeding reaction.

Ophthalmies of the most violent kinds have been said to arise from a *metastasis* of the gonorrhœal poison from the *urethra*, to the *tunica conjunctiva*, or from carelessness and want of cleanliness, by the application of matter from the part affected to the eye, by means of the finger, or the handkerchief: latterly, however, the fact has been a good deal doubted, and I think with great reason.

None, perhaps, will deny the probability of the direct application of syphilitic, or gonorrhœal matter to the eye, not being able to produce a disease, which, from the

length of time that its removal would require, would most likely terminate in the loss of the sight; but what I wish here to inquire into, is, the possibility, or the degree of probability of the matter of *gonorrhœa* being translated from the penis to the eye, or of the capability of a person to affect himself, by matter secreted from his own person.

A *metastasis* in the *gonorrhœa*, often takes place, when the change is made; either to the *testis* producing *hernia humoralis*; to the neck of the bladder, where it is attended with what has been called the *Algedo*; between the *præputium* and *glans penis* causing a spurious kind of *gonorrhœa*; or to the groins exciting buboes. In these instances, the *metastasis* may happen, from a premature or sudden cessation of the primary discharge; but on that stopping, how the poison can so suddenly be conveyed to the eye, a part so distant, and whose action appears not to be con-

nected with the *urethra*, by any of the known laws of the animal economy, is what cannot easily be conceived.

It is true, Monsieur St. Yves says, that the venereal Opthalmy is very rare, but that he has seen several attacked with it, and that in most of them, the disease began two days after the commencement of a virulent *gonorrhœa*, that the matter, not running off by the usual passages, was removed to the eye, through which it flowed, and stained the linen in the same manner as gonorrhœal matter usually does.

Astruc also gives a long and minute description of the venereal Opthalmy ; but on attending to his description, it will be found, that he had never seen the disease except in *one or two* of the patients, of the younger Saint Yves, who, he says, had the goodness to show them him, and he adds, that the elder St. Yves was, he believes, the first that described the complaint. He does



not give so terrible an account of it, as several later writers have done, neither does he reckon it so certainly fatal. His description of it is most minute; some parts of which are fanciful, and given apparently from some presupposed ideas he had formed of the disease: others answer tolerably well to the purulent eye. He says, that though the venereal Ophthalmy succeeds a suppressed *gonorrhæa*, it is *only* in those persons whose eyes are naturally weak and tender; or who have had them hurt, either by a blow or some extraneous matter, by which he thinks a free entrance is *opened* for the redundant venereal poison. The discharge from the eye, he likewise adds, will *in a moment* subside, on the return of the original complaint.

Mr. Benjamin Bell, says but little about the Ophthalmy, from a suppressed *gonorrhæa*, but acknowledges that it sometimes happens, and mentions the case of a young man, “ in whom the purulent discharge



“ from the eyes appeared eight or ten days  
“ after the commencement of a mild go-  
“ *norrhæa*, which came on after being heat-  
“ ed with drinking port wine, when the  
“ discharge from the *urethra*, which had  
“ previously been copious, disappeared  
“ almost entirely. By a quantity of blood  
“ being taken from the temporal artery on  
“ one side; from the division of such vessels  
“ on the eye balls as were turgid, and  
“ the scarification of the inflamed parts of  
“ the eye-lids; by the application over the  
“ eyes of poultices in which opium, and  
“ *cerussa acetata* were dissolved, and gentle  
“ laxatives, the pain, inflammation, and  
“ discharge of matter soon lessened, and  
“ in the course of a fortnight, no symptom  
“ of the disease remained, but a degree of  
“ irritability on exposure to much light,  
“ with which both eyes continued to be  
“ distressed for five or six weeks after-  
“ wards.”

When a person has a *gonorrhœa*, on the application of a greater quantity of *stimulus*, as the drinking of much wine, as in the case of the young man mentioned by Mr. Bell, the inflammation would be increased, but no suppression of the discharge would take place, unless on exposure to cold, which at the same time would be liable to bring on torpor, and a succeeding inflammation of the eyes, more especially if they were already weak; which makes me suppose that the same imprudent exposure to cold, that caused the diminution of the discharge from the *urethra*, for it was not suppressed, produced the inflammation and discharge from the eye. This supposition is farther strengthened, from Mr. B. proceeding to say, “ that in the course “ of the following year, on the same person being attacked with a *gonorrhœa*, but “ of a more violent nature than the former, he was again seized *after exposure “ to much cold*, and riding on horse back, “ to a similar affection of his eyes.” In

this instance too, blood letting, and the remedies formerly prescribed, proved successful.

Mr. Ware, in his “ Remarks on the Ophthalmy, &c.” takes notice of the observation of Mr. St. Yves, upon which he makes the following strong remark; “ this account  
 “ is the more surprizing, because such an  
 “ effect as is here described, has never been  
 “ observed by other writers on the subject,  
 “ or any one of the faculty, with whom I  
 “ am acquainted; though some of them  
 “ have had a long and extensive practice,  
 “ both in the Ophthalmy and *gonorrhæa*.” and the same, I believe, will be confessed by every medical man of experience and observation; and I trust, we shall not be going too far, in declaring, that those cases which have been said to be owing to a suppressed *gonorrhæa*, have been caused by cold; Astruc, we find, says, that it only happens in those persons who have naturally weak eyes, or from

blows, and foreign bodies inserted between the lids, and Mr. Foote, in his treatise on the venereal disease, says, that he does not believe in this doctrine of *metastasis*.

There is another method by which it is said, the eye may be affected with a *gonorrhœa*, and that is, from the patient conveying, by his fingers, or any other means, the matter from the *penis* to the eye, which it is asserted, will bring on an Opthalmy, accompanied with a discharge, similar to that which had previously taken place from the *urethra*: but however probable that may appear in theory, it would be extremely difficult to prove, that it has happened in one instance, by experience. Were it possible for the eye to be affected in that manner, other parts would alike be exposed to its baneful action, and what a fruitful source of misery would be let in upon mankind?



Fortunately, however for us, it appears that we are incapable of infecting ourselves, by our own diseased secretions, which are caused by the direct application of poison. On the application of any specific poison, as the gonorrhœal, to our body, a certain diseased action is brought on, and *gonorrhœa* produced; the matter from which, is capable of exciting a similar disease in another person, though unable to contaminate the body that produced it. If it was not for that law of the animal economy, every infectious disease must be fatal. Matter from a chancre, would cause other chancres, and those again, other sores, till the whole body was covered, or till death closed the scene. The same may be said of *gonorrhœa*, and other diseases; which owe their action to a peculiar poison. The poison of the viper, Mr. Foote says does not affect the viper that secretes it, though it will another viper, or any other animal into which it is effused. It has been before remarked, that syphilitic co



gonorrhœal matter being applied to the eye, would produce its baneful effects on it; that however is a disease which is not here alluded to, but the secondary one, which is the same that has been meant by writers on the subject.

Mr. Foote in denying the possibility of matter from the same person, infecting him in a different part, gives two cases in which a gonorrhœal Ophthalmia appeared about the same time as the diseased action shewed itself in the *urethra*. In both of which, it was very probable, that the matter from the infected person, was applied to the eyes. In one of the cases, the patient, who had weak eyes, was in the habit of washing them with his own urine, and which he did, half an hour, after he had had connection with the woman who gave him the *gonorrhœa*.

Mr. Ware seems to think it very doubtful, if a person can be affected with a dis-

case of the eyes, from the application of his own gonorrhoeal matter, and though we should not be authorised to put the matter to the test of experiment, yet I appeal to every one who has had much opportunity for observation in these matters, whether he has not seen many patients who, to a want of common cleanliness, have added a great degree of inattention, to prevent any ill effects that might arise from the application of the poison to other parts of the body, and when the discharge has been copious, have not only handled the parts a good deal, but even wiped off the matter with their pocket handkerchiefs, and yet the eyes, as well as every other part, have not been affected. Whatever part is in pain, attracts most our attention, and we naturally apply our hand to it, and this hand is often applied to the eyes, the nose, and the mouth; surely then, if it were possible to infect the eyes, that kind of Opthalmy would be very common, and yet I have never met with it: I confess, I have repeatedly attended those

who, at the same time, laboured under *gonorrhæa*, and had a profuse discharge of matter, similar to *pus*, from the eyes, and which the patients have attributed to the *gonorrhæa*, but which clearly was the common purulent eye, which if it happens to come on when the *gonorrhæa* is present, the discharge being similar, has been supposed, without much examination, to proceed from the same cause, and has probably given rise to the idea of the gonorrhœal Ophthalmia.

Though the purulent discharge from the eye is most common to children, yet it not unfrequently is met with in adults, where there has not been the least suspicion of a venereal taint; and I have seen it extremely copious, and as far as the external appearance of colour, consistence, and staining the linen, exactly similar to gonorrhœal matter, and sometimes attended with a great deal of pain. Had this happened with a *gonorrhæa*, what would have been the general conclusion?

It has been supposed too, that inflammations of the eyes may be brought on by the system being universally infected with *syphilis*, though it does not appear, by writers on the venereal disease, that it has any particular action on the eyes; and as the Ophthalmy has been observed to take place when mercury has been given rather largely, to correct or remove the original syphilitic taint, and which of course will render the constitution peculiarly liable to inflammation, from the slightest concurrence of exciting causes. If it is necessary to give this disease any name, and allowable to seek one from a predisposing cause, it would, perhaps, accord more with its nature to call it the Mercurial Ophthalmy.

It has been also said, that Ophthalmies are at times epidemical and contagious, and that they depend on some peculiar property in the surrounding atmosphere. If by this peculiar property in the atmosphere is meant its relative qualities with respect to heat



and cold, moisture and dryness, &c. which may bring the body into such a state as to make it much more susceptible of taking on diseased action, from any irregularity in the application of the usual *stimuli* inducing inflammation, I have no objection to the term ; but if, by it, we are to understand that, at times it is probable the air may contain certain opthalmic particles, if I may be allowed the expression, which, when applied to the body, will produce a specific disease, as variolous effluvia causes smallpox, I must confess it appears to me highly improbable.

Inflammations of the eyes sometimes come on very suddenly, and apparently without any sufficient preceding cause ; this, by the common people, is called a *blast*, and has by them been referred to something noxious in the air, and connected confusedly, in their minds, with what they have observed to happen to trees. It is, likewise, no unusual thing to see several people in one



family, affected at the same time, with Ophthalmies: this happens generally among the poorer classes, and commonly either in the spring or autumn, when the state of the atmosphere is particularly variable, and the changes from heat to cold are daily, and often sudden.

When the Ophthalmy is more frequent than usual in any particular district, it is generally attended, more or less, with a discharge similar to *pus*, from the eye; which probably has some effect in spreading the disease. Though nearly the whole of a family may be affected at the same time, it should be recollected, that they are all exposed to the same exciting causes, and that among the poorer classes especially, they are not sufficiently careful to dry themselves after washing, with different cloths, and cases have come under my observation, in which it was very probable, that the purulent discharge, which is at times so acrid as to excoriate the skin in the vicinity

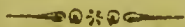
of the eye, applied to another person's eye, produced inflammation, probably from its irritating quality: for it was not always succeeded with a similar discharge.

It has been asserted, by some able physiologists, that the vessels being thrown into such a diseased action, as to produce various or rubiulous matter, or *even common pus*; that this matter applied for the first time, to any part denuded of its cuticle, or where it is very thin and sensible, a similar action will be induced in those vessels, and the same kind of matter secreted: but that, if they have already gone into that kind of action, they are not again susceptible of it: The matter acts as an irritating substance, and a slight inflammation only is induced. Granting that to be the fact, will it not account for the application of matter from one person's eye to another, sometimes producing a discharge of purulent matter, and at another only a slight inflammation?





## THE CURE.



HAVING now, rather in detail, mentioned the occasional remote causes of Opthalmy, it may be requisite to say a few words, on the proximate cause, or that peculiar action of the vessels, which constitutes inflammation. It is not my intention, to discuss the improbability of the multifarious causes, which have been supposed to be the immediate occasion of inflammation, or to point out the strong objections, that might be made to many of them; that belonging more properly to a treatise, written professedly on the subject of general inflammation.

It will be sufficient for our purpose, to say, what, on taking a view of the various causes, which have been said to bring on

inflammation of the eyes, appears the most probable, and which, I trust, will lead us, to a more rational plan of cure.

Were I to examine the whole body, to discover that part, which was the most proper, from the facility with which all extraneous bodies act on it, and the quickness with which any change, in its circulation, is shewn, I could not fix on one more adapted to show the nature of inflammation, than that to which these pages are devoted, the eyes; from which I will take an example of the effects, and action of a body, whose power is owing to qualities, about the nature of which there is little doubt.

A particle of sand being inserted between the lids, and the globe of the eye, by its mechanical irritation, stimulates the vessels, or the fibres against which it is immediately applied, into more frequent and stronger contractions, and a slight



redness is immediately visible; by association, the lids are forcibly closed; the contents of the excretory duct of the lachrymal gland, is pressed out; and the eye is suffused with tears.

If by the flowing of the tears, the sand is removed, the irritable fibre being stimulated not more than usual, the increased action of the vessels subside, and the circulation is carried on as before.

But, if the irritating substance still remains, the contractions of the fibres increase both in frequency, and force, the vessels, adjoining to those first affected, are brought into action, by association, and these again cause those that are nearest to them, to contract, till the parts are affected for some distance from the fibres, first stimulated.

Now, supposing one of the circular fibres of an artery to contract, with a greater

energy than usual, which will suddenly bring the sides of the vessel nearer to each other, and diminish its diameter, it will follow, that there will be a stronger *momentum*, and a greater quantity of blood, propelled against the next circular fibre, than before, which, at the same time that it enlarges its diameter, will stimulate it to contract more violently: the same reasoning will hold good with respect to the adjoining fibre, by which the resistance in the minute vessels, which commonly admit only the transparent part of the blood, will be overcome, and red globules admitted; these and the increased distention will act as strong stimulants and produce pain, which will still add to the irritation.

If the increased action and pain continue for some time, though the original cause of the disease be removed, the inflammation will remain; for the activity of the irritable principle in the part being greater, the vessels acquire new habitudes and new actions, which keep up the diseased motions.

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When the inflammation is only several days in subsiding, after the removal of the exciting cause, as it is continued by the pain which arises from the enlarged diameters of the vessels, and the subsequent force of the contractions, on the pain remitting, the inflammation diminishes, and the action of the vessels partially return to their ordinary state, and, after a few remissions and exacerbations, health is restored.

That the enlargement of the vessels, in what is called active inflammation, depends on the resistance from the irritable principle resident in the arterial fibres being overcome by the *impetus* of the blood, appears from the experiments of Dr. Buvina, who found that, on injecting fresh blood into the blood-vessels of living animals, the blood only, penetrated into those vessels in which red blood circulates during life, but having suddenly killed the animal, by dividing the spinal marrow, the injections immediately penetrated to the most delicate vessels of

the *periosteum*, and other parts, giving them a red colour, which they have not in the living animal.

Since a variety of substances produce the same effect on the eye, as the grain of sand just described; but which, from their form or appearance, do not indicate that quality; we are, perhaps, authorised in concluding, they owe their power also to their stimulating nature. The first we may call a mechanical *stimulus*, the latter a chemical one.

The chemical *stimulus* from the subtle manner in which it operates, and its being more diffused, and applied to many fibres at the same time, is more apt to produce a violent disease.

As the increased action of the vessels, is the very essence of inflammation; for though the pain, and the greater heat, when present, add much to the irritation,



yet they are only the consequence of, and attendant on, the increased action; to remove which, our principle attention ought to be directed.

It has already been shown, that a greater action than ordinary in a part, must depend either on the usual *stimuli*, or the irritable principle being increased; it will therefore necessarily follow, that to diminish the action, the *stimuli* or the irritable principle must be lessened.

The common external *stimuli* may be increased, or a new one added; or the motions of the part, may, by the pain, and the distention produced, act as new *stimuli*, or the new motions may increase the quantity of the supply, or the activity of the irritable principle.

It is universally agreed, that, when the common *stimuli* are increased, they should be moderated, or if any other is added,



that its removal should first be effected, before any thing can successfully be applied, to the eye, to take away the inflammation. I shall proceed, then, to point out the most eligible means of removing, or obviating, the ill effects of the exciting causes.

1. **BLOWS.** On a violent blow being given to the eye, it is to be feared that a derangement of the internal parts will be produced, which may terminate in the loss of sight; our care, however, in the first instance, is to moderate the inflammation, to do which, it will perhaps be more necessary to remark, what ought not to be done, than to point out what should. as, I fear, our extreme officiousness, has often been the cause of more mischief, than the original injury it was intended to cure.

By a blow, the healthy actions of a part are deranged, to restore which, is out of the power of art; it must be the work of na-

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ture, and on the first infliction of the injury, she is generally, more inclined to do too much, than too little. The common method of applying bandages, and compresses on the eye, with the intention of keeping out the light, or preventing the motion of the lids, ought not to be adopted: some also to prevent, or moderate the inflammation, use poultices of various kinds, or cloths wet with different articles, and bound on the eye, all of which are highly improper and injudicious; for by confining the tears, and increasing the heat of the part, as well as by their pressure, they add much to the inflammation.

Practitioners very frequently order linen cloths, wet with different kinds of lotions, to be kept constantly applied to the eye, both after blows and wounds, as well as in common inflammations; and this they do, not so much, perhaps, on the supposition that their lotions have any specific power in abating inflammation, as to keep

the eye more cool, upon the principle that water is a better conducting *medium* of heat, than air, and that the evaporation, that takes place from the wet cloth, assists in subtracting the heat.

This mode of reasoning is fallacious; for although it is well known, that a certain quantity of water will transmit heat, quicker, than a given quantity of air, and that the evaporation which is always going on from water, makes it in summer two degrees cooler than the air, and that even a bottle, containing liquor, and wrapped in a wet cloth, becomes cooler, as is well known in hot climates, where they cool their wine by that process; yet the analogy will not hold good when applied to the animal body.

In one case there is a certain quantity of heat contained in a body, which is of a temperature nearly equal to its own, which is diminished by the evaporation of

the water; in the other, the wet cloth is applied to a body, at a much higher temperature, and whose heat is being perpetually renewed.

A wet cloth being placed in contact with an inflamed part, in two or three minutes, becomes the heat of the skin, and the external part of the cloth, which I will suppose to be four or six folds, will be found, on trying it with a thermometer, both before, and after the application of the cloth, to have sunk only *two degrees*, and even this small diminution of heat, must not be attributed to the skin being cooler, but to the heat substracted from the external surface of the cloth by evaporation, as we find that in warm weather, water is that much cooler than the air.

The application, then, of a wet cloth, does not diminish the heat of the skin, but the part of the cloth in contact with the body soon becomes dry and hard, and acts



as a stimulating substance, independent of its weight, and every one who is at all conversant with diseases of the eyes, must have often observed how small a pressure on the lids, is productive of evident irritation, and an increase of the inflammation.

If a thin piece of linen cloth, was always to be kept uniformly wet, by a regular supply of moisture, which would be attended with a great deal of trouble and inconvenience it probably might be serviceable; but the application of a wet cloth to the eye, which is renewed every two or three hours, which is the usual mode, is undoubtedly prejudicial.

Little more can be done directly after a blow on the eye, than keeping the patient cool, putting him on an antiphlogistic plan, proportioned to his habit of body, and the nature of the symptoms, and desiring all irritating causes to be avoided. The eye may be bathed six or eight times a day, with



lukewarm † water, and kept shaded from the light, particularly if it gives pain.

† I mention warm water, to be made use of, to wash away any irritating substance, whether it is a foreign body, or matter secreted by the eye, which is often found in small particles, and occasions a good deal of pain; and when I come to speak of the cure of the Opthalmy, in the second part, I shall make it appear, that the application of warm water is much more beneficial than cold. This assercion, however, is only to be considered as applicable to the incipient stage of an Opthalmy; for after it has put on the atonic form, cold water is often most proper. How difficult is it to get the better of preconceived opinions, particularly when supported by something like reason! To superficial observers, the inconsistency appears so evident. If a part is hotter than usual, say they, should we not endeavour to cool it, by applying cold water, and how absurd it would be, to use warm water when the part is already too hot!

Although they should find, when the sensation of coldness from the water was gone off, that the part was more painful than before; or if they should be prevailed upon to make trial of warm water under a disguised name, and call it a *fomentation*, and should find ease; that the *stimulus* of the heat from the water could be serviceable to them, would be the farthest from their thoughts.

I claim not this as a new practice, though I hope to extend its application, by pointing out in a more decided manner than has hitherto been done, the utility of it. A Mr. Benedict Duddell, who styled, himself surgeon and

In almost all cases of inflamed eyes, some advantage will be received from the use of a shade, which will be found to do as much good, as bandages and poultices often do harm. With respect to the kind of shade that is most proper, I would recommend a paste-board hood, to be worn, at a greater or less distance from the eyes, as the particular case may require. The hood should be made of a size, not larger than will keep off the necessary degree of light, and will be better if lined with black, instead of green, silk, as is commonly done.

oculist, and who published in 1729, "A treatise on the horny-coat of the eye, &c." almost universally recommends the application of warm water, in diseases of the eyes, which he orders to be used *incessantly*, for twelve hours together, and, as he says, with great success. Mr. Ware also, in "Additional Remarks on the Ophthalmia," in his "Remarks on the *fistula lachrymalis*," says, that in some cases of Ophthalmia on applying "hot water to the eye, the effect was highly grateful, both *cooling* and *strengthening* the part to which it was applied." He attributes its good effects, unphilosophically, to the cooling process that takes place by the evaporation of the water;—but I must defer entering farther into this question, till I come to speak of its operation in abating inflammation.

It should be recollected, that this hood is only intended as a shade, and should not press the head too much; to overheat it, or come very far over the face, to exclude the cool air. If a small bit of cane or whale-bone, of such a length, as to go almost round the head, is firmly sewed to the inside of the upper part of the shade, and then tied behind, with a ribbon, to the size of the head, the lower part will be thrown out from the eye, and from the flightness of its pressure; the facility with which it is raised higher or lower; and the steadiness with which it preserves its situation, almost any quantity of light may be admitted, according to circumstances.

The eye-lids and the adjoining parts are frequently discoloured after blows, and as the appearance is very unpleasant, its speedy removal is very much desired.

A great many things are thought, by the common people, to have the power of re-

moving this appearance in a few hours; as raw meat bruised and laid on the part, Solomon's seal, conserve of roses, &c. but the powers of animal life are not so easily or quickly excited to do what is wished of them; the change must be gradual, and time given for the absorption of the blood; though it may be expedited, by the frequent application of any gentle stimulant, as equal parts of alcohol and water, with a little camphor, tincture of opium, or æther diluted.

2. WOUNDS:—On any instrument or substance penetrating the eye, nearly the same mode of treatment should be adopted, as in blows. If the *tunica cornea*, or *sclerotica* is divided to any extent, the sight will be very much endangered, and as the preservation of the eye, if it is possible to preserve it, will depend on the wound healing speedily, the greatest care should be taken that the curative process of nature be not interrupted by the circulation in the part being hurried.



The patient must be requested to keep the eye-lids closed, and should be confined to a cool, dark room, with nothing at all over or upon his eyes ; but if the lids are inclined to adhere together, and confine the tears, their edges may be kept constantly moist, by the application of any mild ointment ; though it generally answers the purpose better, if the ointment is made solely of animal fat : costiveness should be obviated ; febrile symptoms moderated ; the antiphlogistic plan attended to ; and any matter that may be formed gently and carefully removed, by bathing the eye with a little warm water.

If bandages, &c. are prejudicial after blows, they are much more so after wounds of the eye, though their application to guard the eye from the light, are, in general, so much more convenient to the friends of the patient, than confinement in a dark room, that they are too often had recourse to.

When the wound is healed, and an inflammation remains, it must be considered as an inflammation arising from any other cause, whose original exciting cause has been removed, and treated accordingly.\*

For the extravasation of blood, under the *tunica conjunctiva*, which is the consequence of the division of a blood-vessel, the application of the vapour of æther, on account of its penetrating quality, has been much extolled. Probably this penetrating quality of æther is merely imaginary, it not being able to pass the external membrane, and that the good effects, resulting from its use, ought to

\* How much more rational is the present mode of treating wounds of the eye, to what it was formerly! when, after the depression or the extraction of the cataract, the unfortunate patient was confined to his bed, his eyes bathed with a variety of *powerful specifics*, and covered with a load of bandages for three or four weeks! When the bandages were removed, that his best friend, cool air, might be admitted to him, to moderate the inflammation, alas! it was then often too late, and the miserable victim, sacrificed to mistaken principles, was doomed to darkness.

be attributed to its stimulant powers ; as I have found, the dropping a little spirit and water into the eye answer equally as well.

In speaking of the subsequent ill effects of wounds or blows upon the eye ; an opacity of the chrystalline lens, was mentioned as an occurrence not infrequent : these kind of cataracts, as well as many others, are generally thought incurable, and the whole dependence of both the patient and the practitioner, has been either the depression or extraction of the cataract. In many cases, I have been so fortunate, as as to impede or stop the progress of the disorder, and in some few, to remove it, when fully formed.

In the succeeding part, when I come to treat on the consequences of inflammation of the eyes, I intend laying before the public, my mode of treatment, in opacities of the chrystalline lens, with some cases in which it has been attended with success : let it suffice at present to say, that I chiefly

depend on the application of a variety of stimulants to the eye, of such a strength, and repeated as often, as may be sufficient to keep up a moderate, but perpetual, irritation.

3. Warts and tumours on the lids are mentioned as another cause of inflammation. Warts, after arriving at a certain size, generally suppurate and disappear; but if they are productive of pain, they should be removed.

If the warts are attached to the lids by a small pedicle, they may be cut off with a thread, or more expeditiously by a pair of scissors, or a scalpel.

It is those, however, in general, with a large broad base, that we are consulted about. The best way to remove them, is to cut them off even with the skin, with a small scalpel, and then touch the part with caustic; a small slough will be formed, and the



suppuration that succeeds will take away the remainder of the wart.

In removing tumours of the encysted kind, from the lids, authors commonly recommend the skin to be divided, and the tumour to be dissected out entire; this, if it is situated on the upper lid, is often a troublesome and painful operation, and I think too, attended with unnecessary violence; at least in a great many that I have removed, I have always found it sufficient, merely to lay open the cyst, by cutting into it through its whole extent, and after evacuating its contents, to bring the edges of the wound together by small slips of adhesive plaster, when in a day or two it generally heals by the first intention.

4. The mode of treatment, with the reasoning on the nature and cure of the Ophthalmy, arising from an inversion of the lids, is so accurately given by the ingenious Mr. Ware, in his Remarks on the

Opthalmey, and fo perfectly accords with my own experience, that I fhall beg leave to give it in his own words.

“ For an Opthalmey, produced by an inversion of the lids, a palliative cure may be effected, or to fpeak more conformably to the fact, a present and temporary relief may be given to the patient, by taking out the lashes, with a forceps, a pair of knippers, or any instrument of the like kind. But while the lids retain this inverted ftate, no fooner do the hairs grow again, than the diforder will again return, nor can the patient be ever properly faid to be cured of the complaint, till the edges of the lids are restored to their natural position, and can be kept in it.”

“ It is, however, neceffary, that a diftinction be made between an inversion of the upper and lower lid, for though an inversion of either will produce the fame effect, yet in the different lids it appears

“ to arise from different causes, and conse-  
 “ quently to require different methods of  
 “ cure.”

“ The upper lid, and its ciliary edge,  
 “ both in motion and at rest, are preserved  
 “ in their natural situation, by the equal,  
 “ though contrary actions of the *musculus*  
 “ *orbicularis*, and *Levator palpebræ supe-*  
 “ *rioris*. But the lower lid, whose motion  
 “ is very small in comparison with that of  
 “ the former, has no muscle correspondent to  
 “ the elevator of the upper; and is preserv-  
 “ ed in its natural state, by the equal action  
 “ of the orbicular fibres spread over it, and  
 “ the counteraction of the skin which co-  
 “ vers it; in which last respect it differs  
 “ materially from the upper lid, the skin of  
 “ which, on the contrary, being always  
 “ very thin and flaccid, is incapable of any  
 “ such counteracting power.”

“ From the above account it is manifest,  
 “ that when the *trichiasis* affects the upper

“ lid, it must be owing to a relaxation of  
 “ the *elevator palpebræ superioris*, and a  
 “ contraction of the superior part of the  
 “ *orbicularis*; whereas in the case of a  
 “ *trichiasis* affecting the lower lid, it can  
 “ only arise from a relaxation of the skin,  
 “ and a contraction of part of the *orbicu-*  
 “ *laris*. And as in these two cases, the  
 “ causes of the disorder are very different,  
 “ so they will of consequence, require a  
 “ very different treatment. In the *trichiasis*  
 “ of the lower lid, it will be necessary  
 “ to increase the counteracting power of  
 “ the skin, which covers that lid, so as to  
 “ prevent the undue contraction of the *mus-*  
 “ *culus orbicularis*: whereas in the *trichiasis*  
 “ of the upper lid, it is plain that the  
 “ sole object of attention, must be to give  
 “ an additional *stimulus*, to the *Levator*  
 “ *palpebræ superioris*, for the purpose of  
 “ exciting it to action.”

The *trichiasis* of the upper lid happens  
 but seldom. But in an instance of this



kind, that did occur, an entire cure was produced by a friend of Mr. Ware's, on a young gentleman 18 years of age, by making an incision through the integuments of the upper lid, from the inner angle of the eye to the outer, and then separating the fibres of the *orbicularis*, so as to denudate the expanded fibres of the elevator muscle, as near to their termination in the edge of the lid as possible, and applying a small cauterizing iron, adapted to the convexity of the globe of the eye, and made pretty warm, to the tendino-carnous fibres.

The thought was certainly ingenious, and answered the purpose of curing the inversion of the ciliary edge; at the same time, producing a slight eversion of the lid, which though its appearance is unpleasant, causes none of the disagreeable effects of the other. The gentleman says, the iron was made pretty warm, and that he passed it two or three times over the fibres. I

conclude, therefore, that the iron did not as was supposed act as a *stimulus*, exciting the muscle into greater action, but was so hot as to produce a subsequent inflammation, if not an eschar, sufficiently great to cause the fibres of the *Levator palpebræ superioris*, either to adhere to each other, or to the neighbouring parts, and by that means prevent their natural action; as happens in the adhesions that follow burns.

Though it has been said, that the weakness of the contraction of the *Levator palpebræ superioris* is the cause of the *trichiasis* of the upper lid, yet an inversion of the ciliary edge may be produced, not so much by that muscle being weaker than usual, as from its having a greater resistance than natural to overcome, by the skin being thicker and more relaxed, or the cellular membrane enlarged, by the deposition of a small quantity of sebaceous matter, which will require a greater force to move and elevate it.

In that case undoubtedly, and probably in some others, advantage might be obtained, by applying small slips of good adhesive plaster to the skin, between the upper lid, and the edge of the orbital process of the frontal bone, passing it over the eye-brow to the forehead, and drawing the skin in folds under it. An effect something similar to what is intended by the above contrivance, is observed in common life, as people when they are drowsy, and make great voluntary efforts to keep their eyes open, or to separate their lids wider than usual, corrugate the skin of the forehead, by the contraction of the *corrugatores, supercilii*, and the *occipito-frontalis* muscles.

Relief too, in some instances would probably follow, as suggested by Mr. Wathen, from the application of an iron ring, so adapted to the form of the orbit, that part of it may press on the cartilage of the lid, and prevent its inversion ; and

frequently a very trifling pressure will answer the purpose. The ring should be covered with silk, and made to fasten to the head with a ribband, by a projecting part from each side of the ring, to which it may be attached.

The *trichiasis* of the lower lid, is a much more common complaint, and when recent, can generally be cured, by a proper application of adhesive plasters. Often nothing more will be requisite, than to make a fold in the skin below the inverted lid, by drawing its edge from the eye, and fixing on a-piece of adhesive plaster to keep the fold in its situation.

But it sometimes happens that there is almost a constant flow of tears from the eye, particularly on touching the lid, which moistens the plaster, that it either cannot be fixed firmly on, to preserve the necessary fold of the skin, or if it does adhere at first, the constant moisture soon



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loosens it, on these accounts the use of adhesive plasters, has been often laid aside as ineffectual, when a little more attention to their application would have performed a cure, with ease.

I have frequently succeeded in such cases, by placing the patient's head in such a situation, that the tears, instead of running down the cheek, shall pass out, at the external angle, and by these means prevent the part, on which the plasters are to be placed, from being moistened, and then wiping it perfectly dry, have fixed one end of the plaster as near to the edge of the lid, as I conveniently could, and pulling the other end, have turned out the inverted edge as much as requisite, before the end, that was held between the fingers was applied to the cheek. At times two or three thin slips of adhesive plaster must be fixed on, though one is generally sufficient.

It is not absolutely necessary, that the plasters should be applied to the edge of the lid: indeed in some cases, if they are placed at a little distance, they will succeed as well, if not better, from much larger pieces of plaster being made use of, and the fold of the skin increased. The end proposed can occasionally be obtained, with great facility, by placing a piece of adhesive plaster half an inch broad, and two inches long, nearly an inch below the edge of the lid, and having fixed on half of it, a probe being placed under the plaster, near that part which adheres, and pushed upwards, a very considerable fold may be made, which will prevent the inversion of the lid, and by the contraction of the corrugated skin, remove the cause of the complaint.

Most medical writers on disorders of the eyes, have described and recommended different forms of instruments, which by taking hold of a small portion of the

skin, beneath the lid, and hanging by it, may by its weight, keep the lid from turning inwards, which, they say, will in the end cure the disease.

I do not doubt the application of an instrument, frequently answering the end proposed; at the same time, I must observe, I have met with no case in which such an instrument would be applicable, that might not be cured by a proper use of adhesive plasters, which ought certainly to have the preference, as they give much less pain and inconvenience, not to mention the unsightly appearance of a piece of iron depending from the cheek.

When the *trichiasis* is slight and recent, the application of adhesive plasters, will commonly be sufficient to restore the skin to its natural state, but in more obstinate cases, when the inversion is great, and the skin about the eyes very much relaxed, it may be necessary to cut off a small por-

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tion of the loose skin, below the edge of lid, and afterwards confine the lips of the wound together, by means of two or three sutures. The wound heals in a few days, and the lid is generally restored to its proper place.

In those cases, however, in which the ciliary edges are not only inverted, but also contracted in length, neither of the above methods will succeed; under such circumstances, relief is only to be obtained, by enlarging the circumference of the ciliary edges, either by making a small incision in a right line from the outer angle, to allow of sufficient motion to the lid, or by a compleat division of the cartilage of the lid, through the middle, which will cause each edge to recede towards the angles, leaving a division between them, which will not only remove the complaint for the present, but prevent the possibility of its return in future.



When the Opthelmy proceeds from a preternatural row of hairs, growing out of the inner termination of the edge of the lids, which is generally attended with much trouble and distrefs, no means have hitherto been devised, better than the extraction of the supernumerary hairs, which only gives temporary relief; for though other attempts have sometimes been made, they have proved fo very unsuccessful, as not to deserve further notice.

5. The fortuitous insertion of extraneous bodies between the lids, is another frequent cause of inflammation. These, during their continuance in the eye, produce great pain, and an inability to move the lids, with an increased secretion of tears. The flow of tears is, in general, sufficient to wash away the offending substances; which, on their failing to do, they must be removed by means appropriated to the nature of the adhering bodies, or the manner in which they are fixed in the eye.

The foreign bodies being either sand or dirt, the lids may be separated by the fingers, and on the patient being desired to look towards the opposite side to that in which the extraneous substances lie, they may often be removed with wet lint on the point of a probe, or with a small pair of forceps.

When there is reason to suppose there are many particles in the eye, it may be necessary to throw a stream of warm water over it, by means of a syringe, or to immerse the eye in a wine glass filled with water.

An eye cup, whose shape is adapted to the form of the eye, is generally recommended to be used in these cases, as well as for the application of lotions in the Opthalmy, which is very often attended with an evident increase of the complaint.

If a common wine glass is filled with water, and the head being bent forward,

the edge of it is gently pressed between the lower lid and the cheek bone, the whole of the anterior part of the globe may be easily covered with water, and the upper lid allowed free motion: the depending situation of the head also, will permit more easily the removal of the offending particles.

But in applying a common eye cup, the pressure on the lids is considerable, and the heat from the eye rarefies the air in the cup, so much as to cause a considerable pressure and irritation; the quantity of water made use of is much smaller than with the glass, and the head being held back to suffer a more free admission of the water, the probability of the extraneous body being washed away is diminished.

When the adhesion of the extraneous body is so strong as to resist these attempts to remove it, it may be endeavoured to be separated by a thin blunt pointed scoop, something larger than a common probe, or

lastly, on that proving ineffectual, with the point of a lancet, taking great care that neither the *cornea* or the *tunica conjunctiva* is wounded, which, in the first case, might leave a scar that would afterwards injure vision; or in the latter cause so much irritation, as to render the subsequent inflammation dangerous.

If the extraneous particles adhere so closely to the inside of the upper lid, that a free application of water is not sufficient to remove them, it will be necessary to turn the inside of the lid outward, which may be done without much difficulty, if the lower edge of the lid, or part of the eyelashes, is taken hold of between the thumb and finger of one hand, whilst a probe, or any similar instrument, held in the other hand, is pressed on the outside of the lid, a little above the edge of its cartilage. On the lid being averted, the foreign particle is brought directly into view, when it may be removed, as was before directed,



either by a little lint on a probe, or, in case of necessity, by the point of a lancet.

Lime, from its general consumption, and being often in exposed situations in considerable quantities, frequently by the carelessness of workmen, or the playfulness of children, gains admission to the eye, and is the cause of violent inflammations, and the most dreadful head-aches, followed by a large formation of matter, in the chambers of the eye, or extensive suppurations of the *cornea*, ending in incurable blindness.

Lime, applied to the living fibre, is a strong stimulant, and acts as a violent caustic, from its tendency to unite with the sebaceous matter of the body: in its dry unslacked state, it is very greedy of moisture, and in suddenly absorbing water gives out much heat, which considerably facilitates this combination.

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Any large particle of lime should be immediately removed, by the means above recommended, for extracting sand, or dirt; and as the most serious consequences are to be apprehended, from a small quantity only remaining in the eye, it should be well bathed with some liquid.

Lime will unite with water in a very small quantity, and with the expressed oils more easily; but as it will combine with great facility, with all acids, they, in their diluted state, seem to claim the preference, as an application in these cases. I have frequently found common vinegar, diluted with three or four times its bulk of water, applied with a wine-glass, as before directed, answer very well, and, as in case of emergency, it can generally be procured, it makes it the more convenient.

It is true, the diluted acid acts as a stimulant, yet in the degree of strength, mentioned, it does not give much pain;

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and although it produces a temporary increase of the inflammation, the action of the part soon abates, particularly if it is immersed in a little warm water, and the removal of the whole of the lime, is so desirable, that any momentary pain ought to be disregarded.

Let me again urge the necessity of the utmost care being taken, to wash away all the lime that may adhere to the eye, having frequently seen the worst effects arise from inattention on that head, though it was not at first attended with much pain, or apparent injury.

On examining the eye, after lime, in any quantity, has been in it, part of the *cornea*, or *conjunctiva* will be found white, and have the same appearance as is seen, when strong caustic is applied to other parts of the body, and in fact a combination has taken between the lime, and the animal fibre; and as that must be remov-

ed, and new parts formed, by a peculiar animal process; care should be taken, least that senative action be interrupted, by the injudicious application of stimulant medicines.

The eye should be defended from the light by a paste-board shade, such as directed, Page 106, and the eye frequently bathed in lukewarm water, to wash away any matter that may be formed by the part more immediately affected, and to remove the discharge from the eye, which is often adhesive and irritating: the lids also, as they are often a good deal swelled, and stimulated by the acrimony of the tears, may be kept moist, by some mild ointment.

When the part, that has been burnt, is thrown off by the efforts of the vessels, and the pain, and inflammation have subsided, and an opacity of the *cornea* remains, it must be treated in the same manner as opacities after common inflammations.



I hope I shall be excused for once more repeating, that when the eye has been burnt with lime, lukewarm water only ought to be applied, as none of the common applications made use of, to subdue inflammations of the eye, are proper; and if it should be deemed necessary to do something more than patiently trust to nature, and frequent ablution, it may surely be considered a very pardonable imposture, to prescribe water, to which colour may be given, by a few drops of *tinctura croci*, or something of a similar kind; that the patient may be cheated, as it were, for his own advantage.

In the town of Birmingham, where I reside, whose inhabitants are chiefly employed in the working of metals into a variety of articles, pieces of steel are often struck off their tools into the eye, and from the defence afforded the eyes by the lids, the steel generally pierces the *cornea*, where it is either buried between its *laminæ*, or

sticks in it, presenting a sharp surface to the irritable membrane which lines the lids.

The metal, in general, is very small in quantity, forming only a minute dark speck, and as, from the violence of the blow, it flies off in a heated state, the *cornea* is burnt, yet from the smallness of the particle, on its being speedily removed, no perceptible opacity remains. It is always desirable to have it immediately extracted, for though, if left in the eye, nature would remove it by suppuration, yet on that account the danger of its inducing an opacity, which might hereafter prevent perfect vision, is very much increased.

The method I take to extract particles of steel from the eye, is with a small straight bladed knife, made rather thick in the back, and not brought to a very fine point. Taking this in my right hand, whilst with the left I draw down the lower lid, the patient's head being supported by an assistant

who stands behind, and elevates the upper lid, on the point of the knife being placed under the particle of steel, it generally, on the first or second attempt, is disturbed, and the point of the knife, having been previously well rubbed on a loadstone, attracts the steel, which is immediately removed. This knife I also find very convenient for extracting extraneous bodies of different kinds, and from its form and strength much preferable to a lancet. The lancet is awkward to turn about in the hand, and having a double edge, often wounds the edges of the lids; it is also brought to so fine a point, as frequently to do considerable injury to the eye.

When the steel has buried itself in the *cornea*, it becomes much more difficult to extract, as it will be requisite to insert the point of the knife into the small aperture made by the passing of the metal, and lay open the *cornea* down to it, when it will be nearly in the same state as if situated on the

surface, and must be extracted in the same manner.

If the steel is situated beyond the centre of the *laminæ* of the *cornea*, and more interiorly, towards the anterior chamber of the aqueous humour, great nicety is required in extracting it, least an opening should be made into the anterior chamber, the metal forced into it, and the patient lose his eye. In such cases it may be best to trust to nature, who will often succeed; for the practitioner would certainly be much reflected on, the patient not knowing the peculiarities of his case, if, in attempting to extract a bit of steel, the sight should be destroyed.

In instances of this kind, as the *cornea* in its natural state is insensible, and no rough part of the steel rubs against the lids, not much irritation is excited, suppuration very slowly proceeds, and as it inclines to the surface of the body, the metal by degrees comes out with the matter.



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It might, probably, be supposed, that were the particle of metal to gain admission into the anterior chamber, the inflammation produced would be so great as to cause a suppuration of the internal parts of the eye, and an evacuation of the humours, and that every method ought to be tried to extract the particle in the first instance.

It has already been shewn, in speaking of the effects of blows, that the *chrystalline lens* has been confined in the anterior chamber for years, without producing much pain, and a justly celebrated lecturer, of London, informed me, that once, in making the section of the *cornea*, to extract a cataract, the point of the knife broke, and he believes remained in the eye, though the patient recovered without any unfavourable symptom. The point of the instrument, however, might never have been in the eye; or it might speedily have been washed away by the flowing of the aqueous humour; I will therefore relate a case, exactly in point,

wherein will be seen the effects of a piece of steel remaining in the aqueous humour.

A few years since, a young man came to me from the country, to have a something taken from his eye, which, he said, flew into it a few days before, as he was hoeing turnips. The eye was very slightly inflamed, and on one side of the lower part of the *cornea* was seen, what appeared to me a piece of iron, a good deal larger than is usually found in similar cases; the *cornea* was completely healed over it, and as he did not complain of pain, I declined attempting to extract it; gave him a mild lotion, and desired him to come again in a week.

It was nearly a month before I saw him, when the inflammation of the eye was nearly the same as on my first seeing him, at times giving him a little uneasiness; or if he looked at any thing earnestly, the eye in a short time was filled with water: I now found the extraneous substance, which

I had before observed in the *cornea*, to be in the anterior chamber, a very short distance from where I had first seen it, and hanging by a small filament of matter, in the aqueous humour, and waving, on the eye being moved.

On bringing a large magnet near his eye, and moving it in different directions, the substance obeyed its motions, shewing it to be iron; and though I attempted to remove it, by placing the magnet in various situations, and giving the particle of iron both a quick and slow motion, I was not able to detach it from the *cornea*.

A few weeks afterwards he called on me again, and said the eye was better, but rather weak, and thought if he could have something to *strengthen it*, he should soon be well. The eye still looked slightly inflamed, or as if it was exposed to some small irritation. I particularly requested he would call again, but since that time

have never seen him; I conclude, from the circumstances of the case, he has not experienced much inconvenience from it.

6. Essential oils, alkalies, acids, acrid juices, &c. are next mentioned, as exciting causes of inflammations of the eyes. For their removal, recourse should be had to frequent ablution with warm water, and on an inflammation succeeding, it ought to be considered, whether there has been any part destroyed, by a combination between the animal fibre and the foreign substance, or whether it has acted merely as a stimulant, and increased and diseased actions of the vessels been induced in consequence.

In the first instance the same directions are applicable, as are given after the eye has been burnt with lime; but in the latter case, it must be treated the same as an Ophthalmy, after the application of cold; which will be considered in the second part.



7. When an Opthalmy arises from exposure to too much light, it generally proceeds from a predisposition of the part to diseased action. The exciting cause must be avoided, and the case treated the same as a common inflammation.

8. The eighth cause mentioned, as producing Opthalmy, is the increased secretion of tears, especially with their confinement, to the eye.

With respect to the Opthalmy occasioned by much weeping, from mental affections, or the almost constant flow of tears, which attends the rubiolous eruption, I have no observations to make which are applicable to this place. It is not so with the inflammation of the eyes, which, more or less, is brought on by the eruption of the small pox, when the pustules on the face are in any quantity.

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A small pock pustule has its margin inflamed, and swelled, and when the pustules are numerous, the whole external surface of the body is enlarged. The pustules having the effect of inflaming and enlarging the part, on which they arise, if situated on the eye lids, they become inflamed and swelled; they are closed, and in a short time very firmly so, by an adhesive matter, discharged from the eyes. The question, then, is, whether we ought to endeavour to prevent this closing of the lids, or not.

Some, from the idea that the lids, being closed, are a great preservation to the eyes, will on no account allow them to be touched; but suffer the discharge to collect in considerable quantities, about the edges of the lids; whilst others, from an over officiousness, are almost constantly endeavouring to separate them, to remove the matter as it is secreted. Between these two practices, a due medium should be

observed. The swelling of the lids being the uniform effect of the pustules, cannot be abated, but by the natural course of the disease, and what we ought to attempt is, that the eyes should be irritated as little as possible, and the confinement of the tears prevented. The lids should be touched with the greatest gentleness, any matter that collects, removed with a little warm water, and the edges of the lids kept *very moist* by the application of some mild ointment.

The lids should never be free from the ointment, that it may prevent the confinement of the acrid tears, which is generally the cause of the succeeding inflammation: besides, if they are kept constantly moist, there will be no danger of *strabismus*, which sometimes is brought on, by the eye-lids being partially opened, on the the decline of the disease, and the patient endeavouring to see, through the small part which admits light.

For the inflammation that is an attendant on the *fistula lachrymalis*, some relief may be experienced, by frequently emptying the lachrymal *sac*, by making a pressure on it with the finger; yet its removal must not be expected without the cure of the original disease, but how, or by what means that is to be effected, would lead into by far too long a discussion to enter upon here.

9. Erysipelatous and inflammatory affections of the parts adjoining the eye, are the last causes mentioned, as producing Opthalmy by a direct increase of *stimulus*. The original inflammatory infection will require our first attention, and all that can be done for the inflammation of the eye, is to keep it cool, and as free as possible from all irritating causes.

END OF PART FIRST.



Printed by Swinney and Hawkins, No. 75, High-Street, Birmingham,